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it fit the tube perfectly. This arrow is expelled by the breath with wonderful accuracy. An experienced hunter is able to kill birds in the top of the tallest trees. As the arrow is perfectly noiseless, he is frequently able to shoot several birds before his presence is noticed; thus doing more execution than a sportsman with a double-barreled shotgun. In war, the tips of the arrows are poisoned. A flight of poisoned arrows from Indians in ambush is to be dreaded. See ARCHERY.

Blowpipe, an instrument for supplying a fine, steady jet of air. It consists either of a large tube with a small one joined to it at one extremity at right angles, or of a large tube drawn out into a fine curved tip. When held with the lips closed tightly around the large end, it constitutes, with the mouth cavity and flexible cheeks, a sort of bellows, by means of which an operator in the laboratory is able to create a steady stream of air. The blowpipe is used in chemical analysis and in mineralogy in connection with an alcohol or gas flame to produce an intense degree of heat. A loop of platinum wire or a piece of wood charcoal is generally used as a support. If a substance heated under the blowpipe gives a green color, it is likely to be copper; if blue, it may be cobalt; if violet, potash; if yellow, soda; if brick-red, lime, etc. The odor and the sort of ash, if any, obtained are also depended upon. This method of identifying substances is called blowpipe analysis. The action of the blowpipe is also secured by the use of a rubber bulb held in the hand, by weights, and by compressed air, gas, and other contrivances, especially in large iron works where a terrific blast of air is required.

Blucher, blo͞o′kēr (1742-1819), a field marshal of Prussia. He served under Frederick the Great in the Seven Years' War. A lieutenant having been promoted over his head, Blucher wrote to Frederick the Great as follows: "Von Jaegersfeld, who has no merit except being the son of a Markgraf, has been put over my head: I beg to request my discharge." Frederick ordered him to prison, but later wrote: "Captain Blucher is at liberty to go to the devil." During the Napoleonic wars Blucher rejoined the Prussian army and shared in its reverses. He was one of a number of Germans who did not believe that Napoleon's star would always remain in the ascendancy. He led the Prussian forces in the battle of Leipsic, and followed Napoleon persistently, it may be remembered, to the very gates of Paris. After Napoleon's return from Elba, Blucher took the field again at the head of the Prussian troops. His timely arrival at the battle of Waterloo completed Napoleon's defeat. Blucher's reputation as a fighter is second to none. His reputation for promptness and readiness to charge the foe won him the nickname of "Marshal Forward" by which he is still affectionately remembered in military circles. Numerous statues have been erected in his honor, among which may be mentioned a colossal one of bronze in his native town of Rostock, and one in Berlin by the famous artist Rauch, the same who modeled the statue of Frederick the Great.

Blue, the color of the clear sky. The student of physics would say that it is the color produced by light having waves of a certain length. In the rainbow blue lies between green and indigo. Blue dyes are obtained from several sources. The Alexandria blue used by the ancient Egyptians was made from copper and lime. Cobalt blue is a dye of particular beauty. Prussian blue is a compound of iron. Saxony blue is prepared from indigo. Ultramarine blue is obtained from the mineral, lapis lazuli. Blue is a favorite with the dyer. Commercial blues are obtained chiefly from indigo and aniline preparations. Blue vitriol is sulphate of copper. Pottery blues are obtained from cobalt. The sapphire and the turquoise are blue gems. The Covenanters of Scotland carried a blue banner. They were called true blue Presbyterians. A bluestocking is a woman noted for intellectuality, possibly to the exclusion of womanly graces. Navy blue is the color of the British naval uniform. Blue is also the color of the American uniform; hence, our soldiers are called, not infrequently, "boys in blue." See COLOR.

Bluebeard, a French story by Perrault. It was written in 1697, and was translated into English in the eighteenth century. Since that time, the tale has been told in many forms. The poetical version of J. G. Holland is the one most popular in America. Bluebeard is a type of the cruel husband. Fatima, his young wife, typifies curiosity. She is intrusted with the keys of her husband's castle, but there is one room she must not enter. Of course, her entire thought centers upon this room. At last she yields to temptation, and to her horror discovers in the fatal chamber the bodies of Bluebeard's former wives. In her agitation she drops the key. She picks it up but is unable to efface the stain of blood upon it, so her disobedience is discovered. She is about to meet the fate of her predecessors when friends arrive, rescue the prying wife, and slay the bloody husband. The story has a counterpart in one of the tales of the *Arabian Nights.* It is thought, however, that Perrault found the original of his Bluebeard in a certain Gilles de Laval, notable for cruelty to his family. Holland's poem treats the subject somewhat facetiously. It begins:

Centuries since there flourished a man,
A cruel old Tartar, as rich as a Khan,
Whose castle was built on a splendid plan
With gardens, and groves and plantations.
But his shaggy beard was as blue as the sky,
And he lived alone, for his neighbors were shy,
And had heard hard stories, by the by,
About his domestic relations.

Blueberry, a low berry-producing shrub. Blueberries are much confused with huckleberries, whortleberries, and bilberries. The blueberry is a member of the heath family, hence a relative of the marsh cranberry, wintergreen, bearberry, trailing arbutus, ling, laurel, and pyrola. There are many blueberries. The blueberry of the market is the fruit of a bush from six to sixteen inches high that grows on dry, sandy hills from New Jersey northward to the Saskatchewan and Newfoundland. Many thousand acres in the mountain and waste districts of New York and New Jersey, West Virginia, Pennsylvania, Michigan, and New England are abandoned to blueberry bushes.

The blueberry industry of Maine is systematized most thoroughly. Blueberry tracts are laid off in leases. One third of each lease is burned over annually to renew the bushes and clear the ground. The burning is done at a season when the roots are not injured. August is blueberry harvest time. Pickers work by the quart. The fruit is put up in quart boxes and crated for shipment to market, or else taken in bulk baskets to nearby canning establishments. The owner of the land expects one-half cent per quart as rental. Pickers expect from one and one-half to three cents. The season before a tract is to be burned, when injury to the bushes is of no importance, a berry rake is often used to gather the berries. It looks much like a deep dust pan with a rake-like bottom of teeth, like those of a comb. The mass of twigs, leaves, and berries thus collected is run through a sort of fanning mill to blow out the trash. As at present managed, the part of the blueberry crop of the United States now gathered may be worth, all sections considered, half a million dollars. It is altogether probable that, with an increasing demand for fruit, the blueberry barrens of the old pineries may become exceedingly valuable.

See CRANBERRY; WINTERGREEN; ARBUTUS.

Bluebird, one of the most delightful orchard and lawn birds of America. It is related to the thrush. It is about seven inches in length. The male is bright blue above, with cinnamon sides and a white belly. "With the earth tinge on his breast and the sky tinge on his back," says Burroughs. It ranges from the Gulf to Hudson Bay, wintering from the Ohio Valley southward. In winter it feeds largely on the berries of the mistletoe. So many bluebirds perished in the great freeze of 1895—the same that ruined the Florida orange groves—that bluebirds were noticeably scarce in their usual summer homes for several years. The bluebird prefers the nest in a bird house, but its old home is a hollow tree. Eggs, four to six, white or tinged with blue. There are five distinct species corresponding to the various regions of North America.

The bluebird is gentle, and when not molested loses half its shyness. Its welcome arrival in early spring is alluded to by Lowell in

The bluebird, shifting his light load of song
From post to post along the cheerless fence,

and by Aldrich in

Hark! 'tis the bluebird's venturous strain
High on the old fringed elm at the gate,
Sweet-voiced, valiant on the swaying bough,
. . . . . Alert, elate,
Dodging the fitful spits of snow—
New England's poet laureate
Telling us spring has come again!

Bluecoat Boys, or **Bluecoat School.** See CHRIST'S HOSPITAL.

Bluefish, a salt-water fish of wide distribution along the Atlantic coast, known also as the horse mackerel. Its color is a greenish blue. It is usually two or three feet in length, and weighs from four to ten or twelve pounds. The bluefish is a voracious fellow, eating all sorts of smaller fish, and sometimes those nearly as large as himself. It is prized as a game fish and makes excellent eating. Bluefish swim in large schools, and often kill a greater number of those fish upon which they feed than it is possible for them to consume. It is said that $250,000 worth of bluefish are consumed annually in New York City.

Bluefield, W. Va., is situated 106 miles west of Roanoke, Va., on the Norfolk & Western railroad. It is important as the distributing center for the vast Pocahontas coal fields. An extensive trade is also done in limestone, from ore and timber. It contains a State Normal School and good graded schools. There are also two sanitariums in the city. Population, 1920, 15,191.

Bluefield was settled in 1888 and was incorporated in 1893. The city has adopted the commission form of government.

Blue Grass, a valuable grass of North America. It is called also June grass, from the month in which it usually goes to seed. It grows throughout a wide range from Tennessee far into Canada. It is a durable pasture grass. It stands trampling and drouth well. It comes early in the spring and lasts until the frosts are severe. It is also one of the most nutritious grasses. It favors a flow of milk and gives stock sound bone, wind, and flesh. It gives its name to the famous Blue Grass Region of Kentucky. Blue grass forms one of the finest lawn swards known. It may be grown from seed or by transplanting sod. The latter method is that followed usually in making terraces or covering exposed banks. A thin sod sets better than a thick one, for the reason that new roots find their way sooner into the soil of the bank. The persistence of blue grass and its ability to stand dry midsummers is due to slender root-stocks that hold life like a potato and send up green blades with every shower. Seed is gathered by horse power in an open box, the front edge of which is furnished with a sort of comb which strips off the ripened seed. See GRASSES; KENTUCKY.

Grass is the forgiveness of nature—her constant benediction. Fields trampled with battle, saturated with blood, torn with the ruts of cannon, grow green again with grass, and carnage is forgotten. Streets abandoned by traffic, become grass grown like rural lanes, and are obliterated.

Forests decay, harvests perish, flowers vanish, but grass is immortal. It invades the solitude of deserts, climbs the inaccessible slopes of mountains, modifies climates and determines the history, character and destiny of nations.

Unobtrusive and patient, it has immortal vigor and aggression. Banished from the thoroughfare and the field, it bides its time to return, and when vigilance is relaxed, or the dynasty has perished, it silently resumes the throne from which it has been expelled, but which it never abdicates. It bears no blazonry of bloom to charm the senses with fragrance or splendor, but its homely hue is more enchanting than the lily or the rose. It yields no fruit in earth or air, and yet, should its harvest fail for a single year, famine would depopulate the world.—John J. Ingalls, *Marvelous Blue Grass.*

Blue Jay. See JAY.

Blue Laws, a term applied usually in derision to the early enactments of the New England colonies, more particularly, however, to the laws of New Haven. Blue, as used in this connection, means strict, severe. This usage of the word is English in its origin. The Covenanters of Scotland raised a blue flag. Butler says of Sir Hudibras,

For his religion . . .
'Twas Presbyterian true blue.

Blue laws, therefore, are simply Puritanical laws, laws overly severe. There is a popular impression that the early legislative acts of the New England colonies were notable for strictness, that an unnecessary number of acts were made crimes, and that the penalties for these crimes were unnecessarily and strangely severe. This imputation has been resented bitterly by New England writers, and, indeed, the charge is without valid foundation. In the first place, the list of capital offences was cut short in the colonies. The code of Connecticut adopted in 1642, practically the same as that of Massachusetts, New Haven, etc., made only twelve offences a matter of life and death. These offences were idolatry, witchcraft, blasphemy, willful murder, practicing by poison or otherwise on a person's life, adultery, rape, abduction, false witness with the purpose of taking life, insurrection, and one or two others. At the same time over thirty offences were punishable by death in England, and (in 1662) twenty-five in Virginia. The colonists reduced their list, but the English list grew without repeal until, in 1819, 223 crimes, so far as the statute books went, were matters of hanging.

In comparison with England, the colonists were merciful. The Connecticut laws of 1642 provided, indeed, that "if any man or woman be a witch, they shall be put to death." In 1786, 144 years later, a woman was strangled and burned at Tyburn, London, for making counterfeit shillings. In 1616 a Hamburg coiner of false money was sentenced to "be boiled to death in oil; not thrown into the vessel at once, but with a pulley or rope to be hanged under the armpits, and then let down into the oil by degrees; first the feet, next the legs, and so to boil his flesh from his bones alive." In 1650 it was ordered by the general court of Connecticut that "no man shall exercise any tyranny or cruelty towards any brute creatures which are usually kept for the use of man."

There is an impression that the laws of Puritan Connecticut were more severe than the laws enacted by the Cavaliers. Here are some clauses enacted by Englishmen for the government of Virginia:

> That no man use unlawful oaths, taking the name of God in vain, curse, or ban, upon pain of severe punishment for the first offence so committed, and for the second, to have a bodkin thrust through his tongue; and if he continue the blaspheming of God's holy name, for the third time so offending he shall be brought to a martial court, and there receive censure of death for his offence.
>
> Every man and woman shall repair in the morning to the divine service and sermons preached, upon the Sabbath day, and in the afternoon to divine service, and catechising, upon pain for the first fault to lose their provision and the allowance for the whole week following; for the second, to lose the said allowance and also to be whipped; and for the third to suffer death.
>
> That what person or persons soever shall feloniously kill a tame hogg, being none of his owne, and being thereof lawfully convicted, shall suffer as a felon (*i. e.,* death).

The first and second are taken from the Virginia Articles of 1611; the third is an act of the Virginia Assembly dated 1643. The settlers of Virginia enacted a score of laws providing capital punishment before they had been in the New World a score of years.

The investigator in search of blue laws can find the genuine article in the statute books of old England,—laws enacted not by the Puritans, but by the Cavaliers,—laws which made it a matter of hanging to steal a shilling, to filch a piece of cloth from a weaver, to steal a hawk, or to kill a deer in the king's forest. Colonial legislation was strict compared with the laws of today; but compared with the laws of England, the country from which the colonists had just come, and from which they necessarily derived their idea of law making, the laws of the colonists must be termed merciful. They were not intended to be oppressive. Though to us they seem harsh, unnecessary, and unwise, it should be remembered that these old so-called blue laws were intended to be just, biblical, and to make for righteousness.

Much unjust ridicule has been directed at New England legislation and particularly that of Connecticut, by a so-called *History of Connecticut* published in England in 1781. It was the work of a Rev. Samuel Peters, a native of Connecticut,

and a graduate of Yale, who was driven out of the colonies in 1774 for his steadfast Toryism. He appears to have taken his revenge by publishing a work which he intended to be very damaging to his countrymen. In this volume he gave a list of forty-five "blue laws." They are summarized as follows:

[1] The governor and magistrates convened in general assembly are the supreme power under God of this independent dominion.

[2] From the determination of the assembly no appeal shall be made.

[3] The governor is amenable to the voice of the people.

[4] The governor shall have only a single vote in determining any question, except a casting vote when the assembly may be equally divided.

[5] The assembly of the people shall not be dismissed by the governor, but shall dismiss itself.

[6] Conspiracy against this dominion shall be punished with death.

[7] Whoever says there is power and jurisdiction above and over this dominion shall suffer death and loss of property.

[8] The judges shall determine controversies without a jury.

[9] Whoever attempts to change or overturn this dominion shall suffer death.

[10] No one shall be a freeman, or give a vote, unless he be converted and a member in full communion of one of the churches allowed in this dominion.

[11] No man shall hold any office who is not sound in the faith and faithful to this dominion, and whoever gives a vote to such a person shall pay a fine of £1; for a second offense he shall be disfranchised.

[12] Each freeman shall swear by the blessed God to bear true allegiance to this dominion, and that Jesus is the only King.

[13] No Quaker or dissenter from the established worship of this dominion shall be allowed to give a vote for the election of magistrates or any officer.

[14] No food or lodging shall be afforded to a Quaker, Adamite, or other heretic.

[15] If any person turns Quaker, he shall be banished and not suffered to return but upon pain of death.

[16] No priest shall abide in this dominion; he shall be banished, and suffer death on his return. Priests may be seized by anyone without a warrant.

[17] No one to cross a river but with an authorized ferryman.

[18] No one shall run on the Sabbath day, or walk in his garden or elsewhere, except reverently to and from meeting.

[19] No one shall travel, cook victuals, make beds, sweep house, cut hair, or shave on the Sabbath day.

[20] No woman shall kiss her child on the Sabbath or fasting day.

[21] The Sabbath shall begin at sunset on Saturday.

[22] To pick an ear of corn growing in a neighbor's garden shall be deemed theft.

[23] A person accused of trespass in the night shall be judged guilty, unless he clear himself by his oath.

[24] When it appears that an accused has confederates, and he refuses to discover them, he may be racked.

[25] No one shall buy or sell lands without permission of the selectmen.

[26] A drunkard shall have a master appointed by the selectmen, who are to debar him from the liberty of buying and selling.

[27] Whoever publishes a lie to the prejudice of his neighbor shall sit in the stocks or be whipped fifteen stripes.

[28] No minister shall keep a school.

[29] Every ratable person who refuses to pay his proportion to the support of the minister of the town or parish shall be fined by the court £2 and £4 every quarter, until he or she pay the rate to the minister.

[30] Men stealers shall suffer death.

[31] Whoever wears clothes trimmed with gold, silver, or bone lace, above two shillings by the yard, shall be presented by the grand jurors, and the selectmen shall tax the offender at £300 estate.

[32] A debtor in prison swearing he has no estate shall be let out and sold to make satisfaction.

[33] Whoever sets a fire in the woods, and it burns a house, shall suffer death, and persons suspected of this crime shall be imprisoned without benefit of bail.

[34] Whoever brings cards or dice into this dominion shall pay a fine of £5.

[35] No one shall read Common Prayer, keep Christmas or Saints' Days, make minced pies, dance, play cards, or play on any instrument of music except the drum, trumpet, and jew's-harp.

[36] No gospel minister shall join people in marriage; the magistrates only shall join in marriage, as they may do it with less scandal to Christ's Church.

[37] When parents refuse their children convenient marriages, the magistrates shall determine the point.

[38] The selectmen, on finding children ignorant, may take them away from their parents and put them into better hands, at the expense of their parents.

[39] Fornication shall be punished by compelling marriage, or as the court may think proper.

[40] Adultery shall be punished with death.

[41] A man that strikes his wife shall pay a fine of £10; a woman that strikes her husband shall be punished as the court directs.

[42] A wife shall be deemed good evidence against her husband.

[43] No man shall court a maid in person, or by letter, without first obtaining consent of her parents; £5 penalty for the first offense; £10 for the second; and for the third, imprisonment during the pleasure of the court.

[44] Married persons must live together or be imprisoned.

[45] Every male shall have his hair cut round according to a cap.

In an article contributed to the annual volume of the American History Association, Mr. Walther F. Prince analyzes these laws as

I. Laws unqualifiedly true—6, 8, 2, 3, 4, 9, 10, 13, 22, 39, 40, 42, 43, 15, 14, 16, 17, 21, 30, 32, 23, 38, 28, 34, 31, 37, 19 (first part), 35, so far as pertains to Common Prayer, festivals, dancing, and cards.

II. Laws substantially true—1, 4, 11, 24, 25, 26, 27, 36, 41.

III. Laws not authenticated, essentially misstated or wholly spurious—19 (second part), 18, 20, 29, 33, 12, 35 (in part), 7, 45.

It may be noted that the so-called blue laws that have been quoted oftenest and that have incurred ridicule are spurious.

Blue Print, the standard photographic reproduction of building or engineering plans to be used by contractors or workmen. The paper may be easily prepared, but is better purchased ready for use. It is then exposed to the light under the translucent paper on which the drawing has been made with opaque ink. Water only is needed in the development, which brings out the design in white on a blue background. Rather pleasing blue prints may thus be made from photographic negatives where there is considerable distinction in light and shade.

Blue Ridge, the most easterly ridge of the Appalachian system. It has been customary to give this name to the entire eastern ridge from West Point, New York, southwest to the northern boundaries of Georgia and Alabama. In 1907, however, the United States Board on Geographical Names, determined that the name should be given to that part of the range beginning a few miles north of Harper's Ferry and extending through Virginia and North Carolina to northern Georgia, In Maryland and Pennsylvania the same ridge is called South Mountain, in New York, Schooley Mountain, and Hudson Highlands.

The Kittatinny Mountains in Pennsylvania, New York, and New Jersey, are sometimes called the Blue Mountains, but should not be confounded with the Blue Ridge. The highest peaks of the Blue Ridge are known as the Peaks of Otter. These are in Virginia and are about four thousand feet above sea level. The Blue Ridge is in great part covered with forests of oak, maple, ash, hickory and chestnut. See APPALACHIAN.

Bluestocking Club, a name given in derision to a coterie of literary people who, in the eighteenth century, held social gatherings in London. The purpose of the gatherings was to find for the members social pleasures of an intellectual sort. Cards and gossip were unknown at their gatherings and a marked plainness of attire was agreed upon. The name Bluestocking Club, or The Bluestockings is thought to have been given them from the fact that Mr. Benjamin Stillingfleet always wore blue hose, possibly the most noticeable article of dress in the company.

Blue Sky Laws, a name popularly applied in the United States to statutes enacted by many states to protect purchasers of stocks and bonds from fraud. The first of these laws was passed in 1911, in Kansas. It required investment companies to file with the Secretary of State a full description of their business, and forbade them to sell securities until authorized by the bank commissioner. Following the Kansas plan, 18 other states had enacted similar legislation by 1914, and in 1919 Blue Sky laws of some sort were operative in 44 states.

Opposition to this kind of legislation became strong; its legality was questioned, on the ground that it violated the commerce clause of the Constitution, etc., but in 1917 the United States Supreme Court declared this form of legislation constitutional.

Boa Constrictor, a huge tropical serpent closely related to the python and the anaconda. It is about half as large as

a python. It attains a maximum length of twelve feet. It is found in the forests of South America from the Caribbean Sea to Paraguay. An interesting anatomical feature is a vestige of a pair of hind legs in the form of a pair of claws, situated about where the hind legs of a lizard are found. These claws are of assistance in clinging to the branch of a tree. The boa is noted for having 305 vertebrae. The frog has but ten. The boa constrictor is not poisonous. It is a land serpent. It feeds on monkeys, young peccaries, tapirs, agoutis, and the larger birds. It seizes its prey with lightning-like rapidity, and, holding on with its teeth, throws coils of its body about its victim so as to strangle it. The name constrictor has reference to this habit of crushing its food. When all movement has ceased, the boa relaxes, comes at its feast head first, covers it with saliva, drops its lower jaw out of joint, and gorges its food whole. In the stupid condition which follows, the boa may be attacked with impunity; but woe betide the adventurous monkey that comes too near under ordinary conditions! The boa is large enough, no doubt, to crush a man or a horse, but there is no recorded instance of its having killed either. It is not large enough to swallow a man. See PYTHON; ANACONDA.

Boadicea, bo-ad-ĭ-sē′a, a British queen in the time of the emperor Nero. The Romans at this time occupied a large part of Britain. At his death, 60 A. D., her husband left Nero his wealth and his two daughters, hoping in that way to secure fair treatment for them. The Romans, however, scourged the widowed queen and wronged her daughters. Stung to frenzy by her injuries, Boadicea summoned the warriors of her people and levied war upon the Romans. Camp after camp was taken and the Romans put to the sword. London, then a Roman colony, was reduced to ashes, and Roman citizens, traders, Italians, and other intruders to the number of 70,000 were put to death. The timely return of the Roman governor with a legion of 10,000 seasoned soldiers was all that saved the Romans from utter extermination. In the pitched battle that followed, the Romans remained on the defensive sheltered by their bucklers in a dense grove until the weapons and darts of the Britons began to fail. A general onslaught was then sounded. Men, women, children, beasts of burden, and even dogs were cut to pieces mercilessly by the Roman soldiers. The vanquished queen committed suicide rather than be taken by her conquerors. Boadicea is without doubt a historical character. Our account is derived chiefly from Roman sources. No doubt the numbers given are exaggerated, but it is claimed that Boadicea had 120,000 men under her banner. Seen from the Roman point of view the war with Boadicea was a native outbreak like that conducted by King Philip, Tecumseh, Sitting Bull, Black Hawk, Little Crow, or Joseph. It was the struggle of a native race to regain territory taken by encroaching foreigners. See DRUIDS.

Board of Health, a committee or body of men appointed by the government of a city, state or nation to guard the health of its people. A board of health is concerned with all matters pertaining to cleanliness and sanitation, with disposition of garbage, dangers that may arise in unoccupied or neglected lots, the water supply, the erection of buildings, the preparation and sale of drugs and foods. Regulations to control the spread of epidemic or infectious diseases are also in its charge. In 1879 the United States Government appointed a national board of health, but after a few years it was deemed advantageous to divide its duties among other offices. The first state board of health was established in Massachusetts in 1869. Now, almost all states, all large cities and many small villages have their health boards.

Board of Trade, a term applied (1) in the United States to the grain exchanges, or grain markets, of which the Chicago Board of Trade is the leading example; (2) in Great Britain, to an important department of government. It is also sometimes used in the United States to designate a local association of merchants for mutual or civic benefit, and in this sense is synonymous with *Chamber of Commerce* (which see).

The Chicago Board of Trade is a commercial organization operating under a special charter from the State of Illinois, and composed of about 1,600 members, of whom about 1,100 reside in and about Chicago. It transacts no business as an organization, but furnishes a trading place for the marketing of grain, adopts rules of business conduct, collects statistical and other information of interest to the members, assists in the adjustment of business disputes, and in general promotes the common interests of the entire membership and protects the interests of those who use the market facilities provided. The floor of the Chicago Board of Trade is the auction place for the grain crop, and is the chief factor in making the market prices for wheat and other grains from day to day and hour to hour. Here are gathered hundreds of buyers and sellers. The seller, representing the producer, seeks the highest possible price. The buyer, representing the consumer, seeks the lowest price. The visible supply of grain, be it surplus or shortage, is the final arbiter of values; and the prices quoted represent the composite opinion of the world.

"The Chicago Board of Trade is the most economical agency in the world for the distribution of foodstuffs," was the statement made by Herbert Hoover before a committee of Congress; and Mr. Hoover, who was Food Administrator of the United States during the great war, is the world's leading expert in crop distribution. The foundation of the Chicago Board of Trade, and of every other grain exchange, is the "cash" grain business. Its true function is to "make a market" for the grain crops of the country—a market so broad that any quantity of grain, either "cash" or "futures," can be sold at any time, and, in addition, to distribute the grain crops from producer to manufacturer at a minimum cost. In the cash market of the board 400,000,000 bushels of grain are handled in a year, making Chicago a giant granary; while the "futures" market, part speculative, provides hedging or price-insurance facilities. "Hedged" grain protects the owner against losses through price fluctuations. Such insurance may cover the grain from the time it is grown until it reaches the mill. Like fire insurance, it removes the speculative risk. This removal of the speculative risk, made possible by the modern grain exchange system, results in the farmer receiving more for his grain and the consumer paying less. Thus a great economic service is performed by the futures market. The term Board of Trade is also applied to the grain exchanges in a number of other cities.

Great Britain. The British government department known as the Board of Trade was originated by Oliver Cromwell in 1655 and established as a permanent committee of the Privy Council in 1786. The president is a member of the cabinet. It comprises (1) the commercial, labor, and statistical department, concerned with all matters of trade; (2) the marine department, which supervises shipping and seamen; (3) the harbor department; (4) the finance department, which audits reports of life insurance companies; and (5) the fisheries department.

Status in Canada. In Canada the name Board of Trade is given to an organization similar to the numerous Chambers of Commerce in the United States. The Canadian Boards of Trade are chartered and incorporated in accordance with an act of Parliament of 1886, amended in 1920. The original act provided that a corporation might be organized by thirty persons, being merchants, traders, brokers, mechanics, manufacturers, managers of banks or insurance agents resident in the district. The amending act of 1920 removed the restriction of residence in the district, thus making it possible for any thirty persons to organize a board, either active or associate. Many boards of trade admit as members professional men: lawyers, doctors, teachers in schools and colleges.

Boar Hunting, a favorite sport in the Middle Ages. Royalty itself did not scorn to take the field with horn and horse, boarspear and boarhound, to hunt the wild boar. Several species of wild swine range the forests of the Old World, but the wild boar of the hunt is a large, strong, swift, courageous, easily provoked

animal with dangerous tusks. It has a grayish black, woolly coat, interspersed with long hairs which increase on the back of the neck and shoulders into a bristling mane, giving the animal a ferocious aspect. In *Quentin Durward,* Sir Walter Scott, it may be recalled, describes William de la Marck as "the Wild Boar of Ardennes." Quentin himself won the favor of the French Louis by rescuing him from the tusks of a boar and then keeping his own part in the affair to himself. A few specimens of the wild boar still linger in North Africa, Asia Minor, and in the forests of large landed proprietors in eastern Europe where it is still hunted. The present czar of Russia takes an interest in the sport.

The boar's head was the sign of a tavern in Eastcheap, London, well known to readers of Shakespeare. It is the well known heraldic emblem of various old families. The boar's head at table, and boar's head carols were a time honored part of English Christmas festivities.

Then was brought in the lusty brawn
By blue-coated serving-man;
Then the grim boar's head frowned on high,
Crested with bays and rosemary.
Well can the green garbed ranger tell,
How, when, and where the monster fell;
What dogs before his death he tore,
And all the baiting of the boar.
—Scott, *Marmion.*

Boat, any small water craft, especially such as are propelled by oars. The first boat was no doubt a floating log. Two logs tied together form a raft. Among primitive people the canoe hollowed from a single log by burning with hot stones is the leading type. The natives of Borneo, of the Amazon region, of the forest region of Africa, and of many other regions were found using canoes of this kind. Some of them are forty or fifty feet in length, and carry a score or two of men. The American dugout is a canoe of this sort made with tools. The coracle of the Briton was a wicker basket covered with a skin to exclude water. The Eskimo kayak is formed of sealskins stretched on a frame of bones or bits of wood. It is covered with a sealskin deck, with a hole in the center in which the hunter sits. He draws the deck about his waist, like the mouth of a bag and thus renders his craft watertight. The Rob Roy in which McGregor cruised on the chief rivers of Europe was a boat constructed on this model. The most artistic native canoe is made by the North American Indians. It consists of strips of light, tough wood covered by sheets of birch bark sewed together with sinews or roots and calked with resin. The birch bark canoe is so light that a man can bear on his back a boat capable of carrying several persons. This is the type of boat described in Longfellow's *Hiawatha.* It is still in use in the Indian reservations. It is the type of boat used by the Jesuits and the employes of the great fur companies.

The common rowboat or skiff is made of many patterns. Boards are bent and fastened on a frame. If the edges of the boards meet edge to edge, forming a smooth surface, the boat is said to be carvel-built. When the lower edge of one board overlaps the upper edge of the board below it, the boat is clinker-built. A clinker-built boat is more easily made and is less apt to leak.

The names applied to the various kinds of boats are almost too numerous even to mention. Of the boats kept on shipboard for use going ashore, landing passengers, bringing off supplies, etc., the launch, longboat, jollyboat, cutter, gig, dingy, pinnace, and yawl may be mentioned. The whaleboat and the dory are used by fishermen. The lifeboat and the catamaran are designed for the surf. The punt, lighter, scow, barge, flatboat, bateau, ark, and houseboat are flat-bottomed affairs propelled by poles set against the bottom, or allowed to drift with the current, or else towed along. The gondola is the boat of Venice. The hoisting of sails introduced a multiplicity of names, still further increased by the use of mechanical power.

Motor Boat is a general term applied to small vessels propelled by gasoline or kerosene engines, or by electric motors. If such a vessel be over, say, 65 feet in length, the term "boat" no longer applies, but it is called a motor yacht, motor tug, motor barge, or even motor ship, for ves-

sels of the largest size are now propelled by engines of internal-combustion or turbine type. Where power is used as auxiliary to sails, the craft, even if small, is not called a motor boat, but an auxiliary sloop, auxiliary schooner, etc.

A rowboat or even a canoe may be readily converted into a motor boat by means of an outboard motor. This is a small self-contained gasoline engine, combined with a propeller, which may be attached to the side of a canoe or the stern of a small boat, and detached at will, so that, weighing as little as 55 pounds, it may be carried as ordinary baggage for use when required. Motor boats equipped with engines of varying size and horsepower are now common in all waters, and range from 14 feet upward in length. They are often used for short distances in passenger traffic, but mainly for pleasure purposes, motor-boating having largely displaced sailing as a popular sport on the coasts, lakes and rivers.

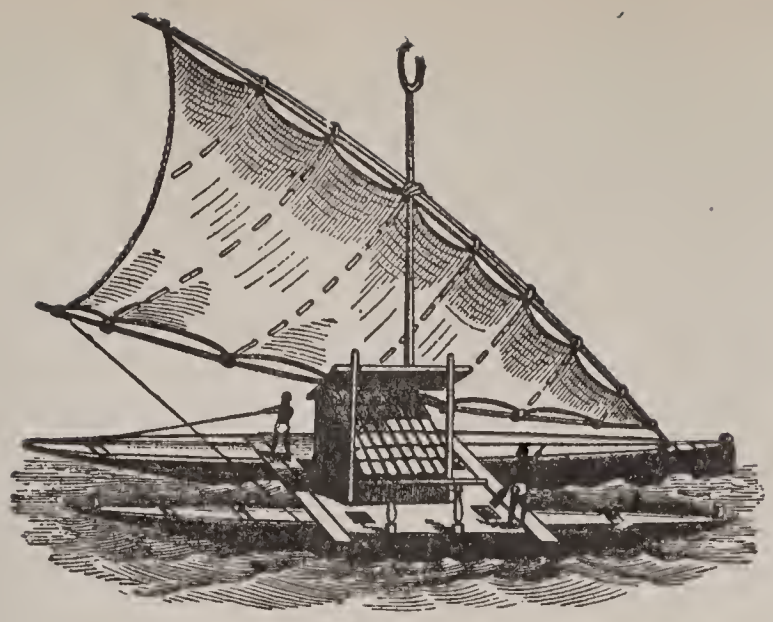
The marine gasoline engine industry dates from about 1885, and was developed in the nineties. Boats driven by this power were exhibited at the World's Fair in Chicago in 1893, and at the same time boats run by electric current from storage batteries made their appearance and were popular for a while, but were called electric launches, to distinguish them from boats driven by internal-combustion engines. In recent years the gasoline motor has prevailed over all other types for marine use. The motor used may be of either the four-cycle or the two-cycle type. In the first, as in the automobile engine, the function of the motor is four-fold: (1) It has to open the inlet valve and draw in the charge of gas which has been made explosive by mixture with air in the carburetor; (2) it has to close the inlet and compress the charge; (3) it has to fire the charge, by means of a spark plug and ignition system, so as to force the piston outward to do its work of turning a crankshaft which, passing through the keel of the boat, revolves a propeller in the water; (4) it has to expel the burnt gases, or exhaust. It is owing to these four operations having to be performed in sequence that this type of motor is known as a four-cycle motor. As the first operation is to draw in a charge of gas, it will be seen that before the engine can be started it is necessary to rotate the crankshaft, either by hand or some mechanical means, such as a self-starter, similar to that of a modern automobile, so that a charge of fuel gas is drawn in and compressed. When this is fired the engine should continue to operate automatically.

The two-cycle marine engine, commonly used for heavy duty, causes an explosion of the fuel gas at every revolution of the crankshaft. In this type of motor-boat power, the cylinder is not utilized for the purpose of compressing the charge, although the piston is. The crankcase acts as a supplementary air chamber into which the gas to be fired can be drawn and then forced into the cylinder under pressure. The incoming gas charge forces out the exhaust gases.

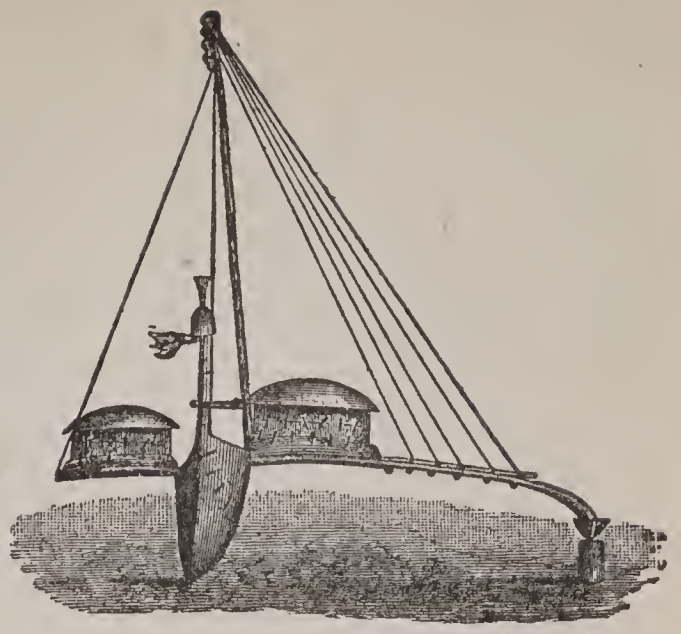
Motor boats used for pleasure are classified as follows: Open boats, cabin cruisers, speed boats and hydroplanes. The latter, a development of the speed boat, has a keel consisting of two or more planes with steps between them for lifting the body of the boat out of water at high speed. Many fast boats have been devoloped under the influence of annual regattas for power-boat racing, and Miss America in 1921 at Detroit won the Gold Challenge Cup with a record speed of 71.4 miles an hour. For the cruising type of motor boat, annual races from New York to Bermuda, 670 miles, have produced a seaworthy type which is now common on the Great Lakes and elsewhere on inland waters as well as on the coasts. In the commercial field, motor boats are used in fishing, lobstering, oyster dredging, and the transportation of freight as well as passengers.

The great popularity of the motor boat for pleasure and sport is largely due to the fact that no licensed engineer is required for its operation. The government regulates the equipment, however, both navigating and life-saving, but boats of under 16 gross tons do not even have to be registered.

See NAVY.

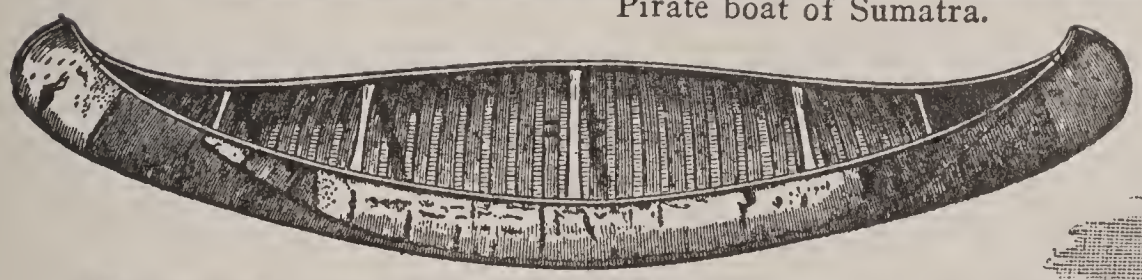


Double boat, Fiji Islands.

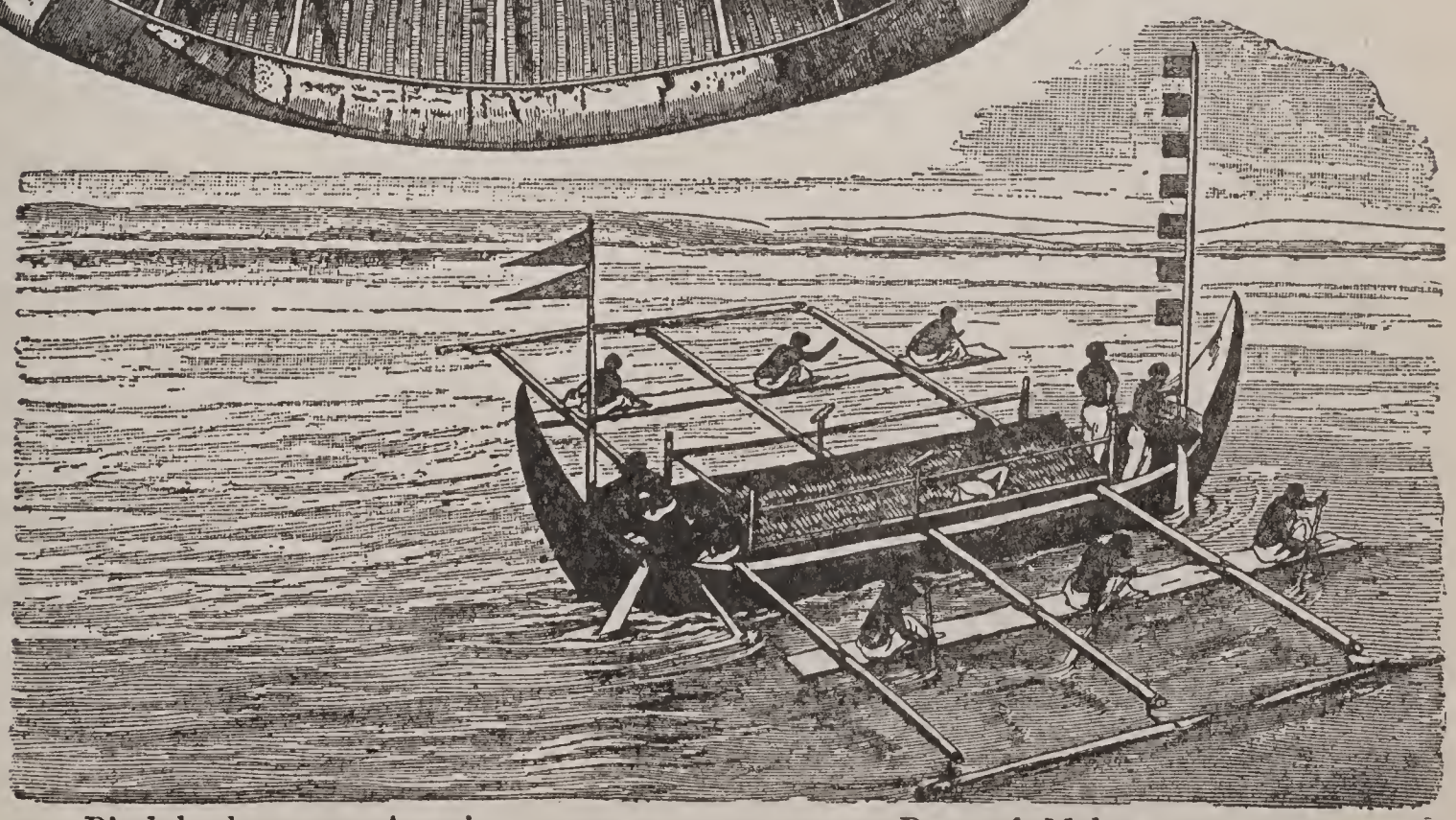


Outrigger, Marshall Islands.

Pirate boat of Sumatra.



Birch-bark canoe, America.



Boat of Molucca.

TYPES OF BOATS.

Bobbinet, a kind of machine-made netting, woven with six-cornered meshes. In making bobbinet the warp threads, 700 to 1,200 to a yard, are stretched from a roller. The weft threads are wound upon bobbins, as many as 1,200 being used sometimes. One set of these bobbins moves diagonally from right to left. Another set moves diagonally from left to right. Each diagonal thread makes a turn, about each warp thread, forming thus the six-cornered meshes. The best machines can produce 30,000 meshes a minute. The manufacture of bobbinet was the first step in the making of machine laces. Up to the early part of the nineteenth century all lace was produced by hand work. One variety called Brussels lace showed open spaces in which the threads were twisted and knotted into a regular mesh. In attempting to imitate this lace an effort was made first to produce this open mesh as a ground for the pattern. The first successful machine was invented in 1809 by an Englishman, John Heathcoat.

Bobolink, a familiar bird related to the oriole, meadowlark, and blackbird. The bobolink breeds from Montana to Nova Scotia and southward to the Ohio Valley. The female has modest olive plumage streaked with black. Yellowish underneath. In the mating season the male is finely appareled in black, buff, white, and yellow. As the season draws to a close he puts off his gay feathers and dons an olive traveling suit resembling that of the female and the young. In the grain-growing states the bobolink families gather into large flocks at the harvest season, and are called yellow birds locally. After feeding on the ripening grain in the field and shock, they migrate and reappear in the rice swamps of the South, where they are known as rice birds and reed birds, and are hunted for the table. Here they are charged with eating $2,000,000 worth of rice yearly. Still later they resume their southward migration, chiefly by way of Florida, it is said, and pass the winter south of the Amazon. The male bobolink precedes the female a few days in the spring flight to northward, coming again by way of Florida in large flocks. During the southern sojourn the olive tips of his feathers have worn off, and he reaches our shore clad in spring finery.

The bobolink's summer life cannot be better described than by the poet Bryant in *Robert of Lincoln,* beginning,

> Merrily singing on brier and weed
> Near to the nest of his little dame.

Lowell, however, is the poet of the bobolink. We cannot omit two passages, the first from *The Biglow Papers,* and the second from *An Indian-Summer Reverie*:

> 'Nuff sed, June's bridesman, poet o' the year,
> Gladness on wings, the bobolink, is here;
> Half-hid in tip-top apple-blooms he swings,
> Or climbs aginst the breeze with quiverin' wings,
> Or, givin' way to 't in a mock despair,
> Runs down, a brook o' laughter, through the air.

> Meanwhile that devil-may-care, the bobolink,
> Remembering duty, in mid-quaver stops
> Just ere he sweeps o'er rapture's tremulous brink,
> And 'twixt the winrows most demurely drops,
> A decorous bird of business, who provides
> For his brown mate and fledglings six besides,
> And looks from right to left, a farmer mid his crops.

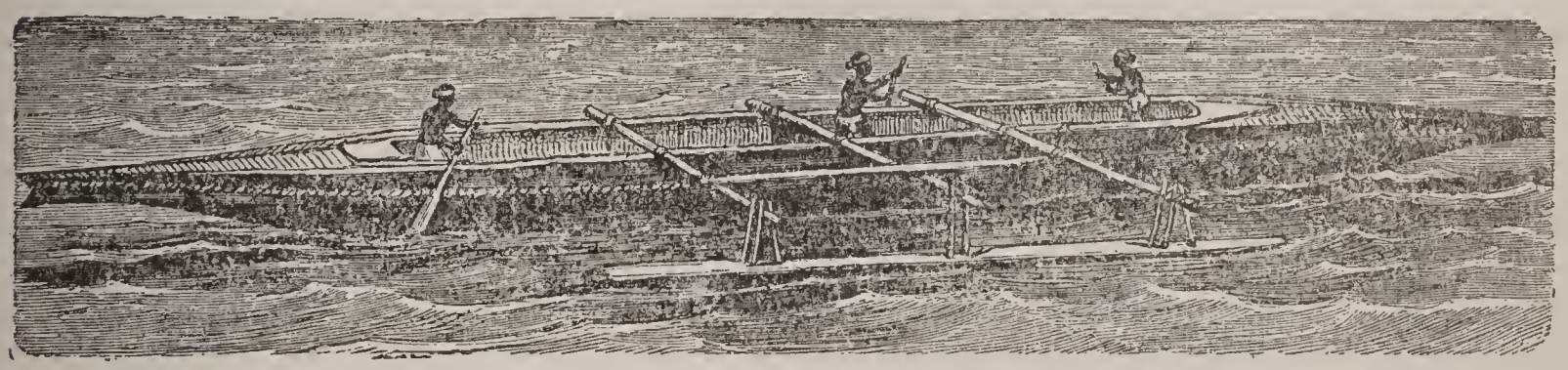
See BIRD.

Bobwhite. See QUAIL.

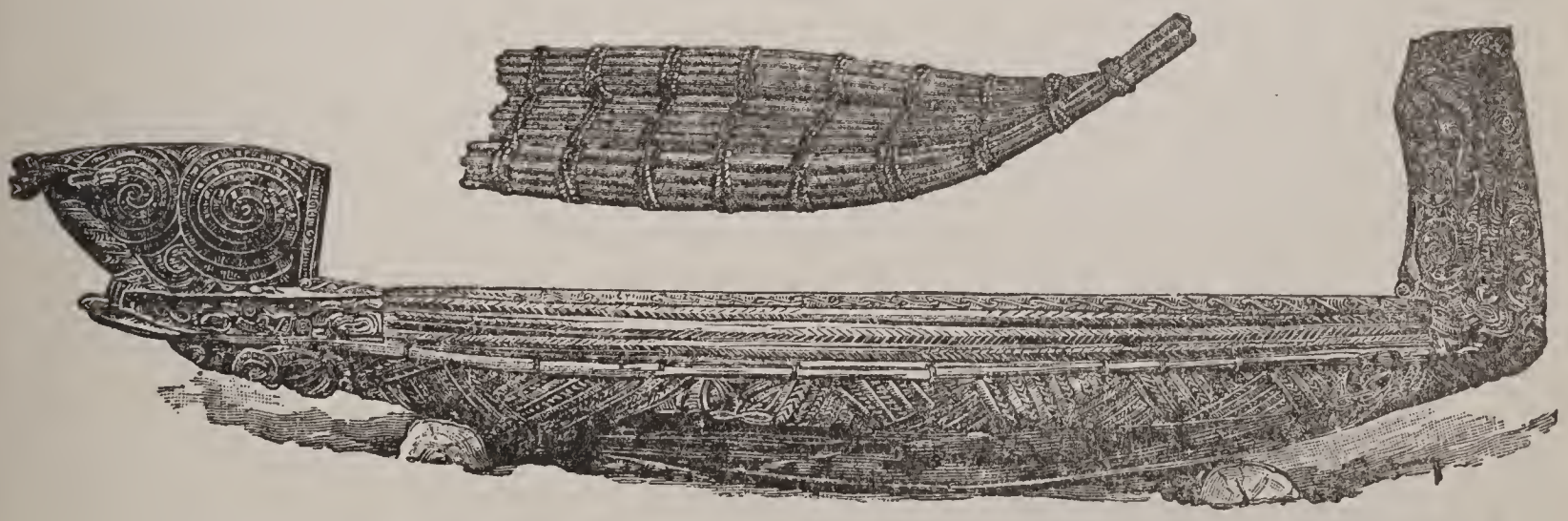
Boccaccio, bok-kät'chō (1313-1375), a celebrated Italian writer. He was the son of a wealthy merchant of Florence. He received the best education afforded by the times. He ranks with Dante and Petrarch as one of the three great founders of Italian literature. His reputation rests chiefly on the *Decameron.* This is a collection of tales written during the period when the Great Plague desolated Italy. It was designed to amuse the ladies of the court at a time when ordinary social pleasures were out of the question. The tales are united by the supposition that they are told by a party of ten people who have retired to a villa near Naples. Each tells ten tales; in all, bringing the number up to one hundred. It is supposed that Boccaccio got his idea from the Arabians, who, in turn, had it from the Hindus. The same plan was followed by Chaucer in his *Canterbury Tales,* and

Catamaran. Roots of trees.

Eskimo kayak.



Boat of Uganda.



Boat of reeds, Upper Nile. Carved boat of New Zealand.

TYPES OF BOATS.

by Longfellow in his *Tales of a Wayside Inn.* Boccaccio's tales rank very high as specimens of literary style. His language is easy and correct. One of the most beautiful of the tales is that of Griselda, the last in the collection. Unfortunately for the present popularity of the *Decameron,* the author yielded so far to the coarseness, not to say to the prevailing indecency of the times, that his tales are now little read by people of good taste. In his later years, Boccaccio became a clergyman and a professor in the University of Florence. He lectured on Dante's *Divine Comedy.* He wrote a life of Petrarch. His former home, a beautiful villa, is still pointed out to travelers. See PETRARCH; DANTE.

Bodleian Library, the reference library of Oxford University. It derives its name from a donation of rare books purchased on the continent by Sir Thomas Bodley at a cost of $50,000, and presented to the University in 1597. Sir Thomas also left an estate, the income of which is still devoted to the care and enlargement of the library. Others have left fortunes to the library. Several large collections of early prints, first editions, and priceless Arabic, Greek, Latin, Hebrew, German, Anglo-Saxon, and oriental manuscripts have been acquired. A copy of every book published in the kingdom is, by act of Parliament, deposited with the librarian. The income from bequests is used to purchase old books. The library is especially rich in early editions of the Bible in all tongues. The entire collection is at the service of scholars on the most liberal terms. The library now includes over half a million volumes and ranks next to that of the British Museum in point of value to scholarship. See LIBRARIES; BRITISH MUSEUM.

Boehmeria (after the German naturalist Böhmer),a genus of plants, the fibres of which are used in the making of ropes, twine, net, sewing thread and cloth. It is much cultivated in China, and as a consequence the bulk of fibre is produced there, where labor is cheap. One variety is indigenous to the United States, where it grows in waste places from Canada to Florida. Its cultivation has been introduced into the United States, in the southern part, and in California, where it will without doubt prove useful.

Boeotia, bē-ō′shĭ-a, a division of ancient Greece, north of Attica and having Thebes for its chief city. This district is nearly surrounded by mountains and when its principal river, the Cephissus, was in spring flood, the plain for miles around became a lake. At other seasons the region was marshy and unhealthful. In the time of Alexander the Great, an outlet for the water was provided by a vast tunnel cut through rock, but in the course of years this fell into ruin and the district was never properly drained until modern times. Boeotia is remembered by reason of the Boeotian league, a union of twelve cities with Thebes at its head. This league sided with Sparta against the power of Athens during the Peloponnesian War, then, with other states, rebelled against Sparta's cruel rule. It reached the height of its power under Epaminondas, who by the victory won at Leuctra, made Thebes supreme in Greece. The Boeotians were dull and coarse compared with the other states of Greece, never approaching them in culture. Nevertheless, Hesiod, Pindar and Plutarch were from this region. Boeotia and Attica together form the modern nomarchy of Greece. See THEBES; EPAMINONDAS; ATTICA.

Boers, bo͝ors, South African colonists of Dutch descent. The word is Dutch, akin to boor, meaning a peasant or husbandman. The Boers began the colonization of South Africa in 1650, at a time when the Dutch were the leading maritime power in Europe. During the oppressive wars with Louis XIV, there were serious thoughts of abandoning Holland for Cape Colony.

The history of the Boers is one of peculiar injustice. They settled at Cape Colony as the Puritans settled in New England, and at about the same time, and for a similar purpose. They desired to be let alone and to build up a church in their own way. In 1795, during the wars of the French Revolution, the English took possession of the colony. It was

was formally ceded to England in 1815. The colonists moved northward from time to time with their slaves and flocks, carrying on an incessant conflict with treacherout natives, whom they exterminated or reduced to slavery. As fast as they rendered a tract of country desirable, the English followed them up, and the Boers trekked farther northward to find a new place of residence. In this way, Cape Colony, Natal, and the Orange Free State, were settled, improved, and given over wholly or in part to the British.

The Boers made their last stand in the Transvaal, where, by treaty with Great Britain, they were accorded a sort of independence; but the discovery of valuable diamond mines in their vicinity proved their undoing. British adventurers rushed in. The result was a foregone conclusion. The Boer territories became a part of the British Empire, and in 1910 the Transvaal and the other self-governing colonies, Cape of Good Hope, Natal, and the Orange Free State, were incorporated in a federal union known as the Union of South Africa, with the seat of government at Cape Town. See AFRICA.

Boerhaave, bo͞or′hä-ve or bōr′häv (1668-1738), a Dutch physician and philosopher famous in the eighteenth century. He was born at Voorhout near Leyden. As his father designed him for the church he received a liberal education. He entered the University of Leyden at the age of sixteen and six years later took his degree in philosophy. He soon discovered, however, that he was destined by nature for the medical profession and began studying to that end. His abilities were soon recognized and in 1701 he was appointed lecturer at the University of Leyden on the institutes of medicine. He filled later the chair of botany and medicine in the same institution, and in 1714 was made rector of the University. His spare time was devoted to the study of chemistry, botany, and mathematics, and he published several works of which the *Elements of Chemistry* is the most noted. The name of Boerhaave became known throughout Europe and patients came to him from all directions. It is said of him that "from the time of Hippocrates no physician had more justly merited the esteem of his contemporaries and the admiration of posterity." He was especially remarkable for his penetration and sagacity which enabled him to diagnose diseases baffling to others. The fame of this great man so raised the reputation of the university that it became a resort for strangers from all parts of Europe. It is said that he once received a letter from a Chinese mandarin, directed only "To the Illustrious Boerhaave, physician in Europe."

In 1729 failing health obliged the great doctor to give up a portion of his work. Gradually other tasks had to be laid aside and in 1738 after a lingering illness he died. A splendid monument was erected to his memory in the church of St. Peter, bearing the inscription "To the Health-giving Genius of Boerhaave."

Bog, a quagmire covered with vegetable growth. The term is Irish, meaning soft, or, as some claim, trembling like jelly. The Scots term is moss hag. It is difficult to distinguish between bog, swamp, marsh, morass, fen, and quagmire. Moss hag is expressive of the vegetable growth, and quagmire, or quake mire, is expressive of the spongy, shaky nature of a bog.

Bogs are most frequent in the northern part of the world. The most common form is the peat bog. Bogs may form wherever the surface is reasonably level, provided the supply of moisture be sufficient. A mossy growth acts like a sponge. Peat bogs of great extent are found on gentle mountain slopes, providing mists are frequent. Owing to some peculiarity the mosses of bogs do not decay. The new plants mount above the old for ages, and not infrequently elevate the surface of a bog far above the surrounding country. The Dismal Swamp on the border of Virginia and North Carolina is several feet above the level of the adjacent solid land. According to recent accounts certain bogs in Ireland have grown so high, and have become so swollen, that they have broken loose or burst, and have poured forth a destructive torrent over meadows and fields, even burying houses beneath a slide of peat and mud. The

government has been called upon to drain these bogs to prevent further destruction of property.

Bogs make the richest of fields and meadows. They require thorough drainage. If the deposit of vegetable growth be heavy, it is necessary to mix in earth to afford a footing for the bacteria or germs of decay. Though rich in the materials required by the roots of grasses and field crops, pure peat will lie forever without rotting and becoming available, unless decay be started by the admixture of earth or manure. Once started, decay will continue. A peat bed once set to grass is likely to yield a crop of hay for an indefinite time.

The term bog-trotter is applied in derision to the inhabitants of a bog country, particularly to the people of certain districts of Ireland. When it is known that some of these bogs are forty feet deep, and that once beyond his depth a person is gone forever, the skill of the bog-trotter who speeds across these quagmires, springing from tussock to tussock with an unerring knowledge of what will support his foot and what will not, does not seem so light a matter. Peat diggers in the Solway bogs of Scotland have come upon a horse and man in complete armor, and tradition has it that the rest of an army lies farther in. The genuine peat bog, being free from the germs of decay, preserves both flesh and fallen trees indefinitely.

The most celebrated bog of antiquity is the Serbonian Bog situated between the delta of the Nile and the Suez Canal. When concealed by drifted sand, it proved the destruction of the unwary.

> A gulf profound as that Serbonian bog
> Where armies whole have sunk.
> —Milton, *Paradise Lost.*

Bohemia, formerly a province of the Austrian Empire, today a portion of the new Czecho-Slovak republic. It took its name from the *Boii,* a German tribe known in the time of Caesar, and *heim,* the German word for home. The Bohemians are a Slavonic people who crowded in later. They are related to the Moravians, the Poles, and the Hungarians. They have a language no German can understand, and a literature no German can read. In 1348 they founded the University of Prague. Huss and Jerome, the great heretics and reformers, labored for the Bohemians in their own language, as Luther did in German and Wyclif in English. The native language of Comenius was Bohemian. In 1620 there were eighteen printing presses in Prague alone.

Although the boundaries of Bohemia are marked by mountain ranges of greater or less height the country has always been subject to invasion. Independence was never maintained continuously. The House of Austria, in particular, claimed a sort of overlordship. Ferdinand I acquired a legal right to the Bohemian crown by marriage with Anne of Bohemia. In 1627 Ferdinand II declared Bohemia a purely catholic and hereditary kingdom of the empire. Bohemia suffered terribly during the Thirty Years' War. By political and religious persecution, 30,000 families were driven away. Some authorities claim that as high as 70,000 men, including the Hussite clergy and the nobility of Bohemia, were driven westward to Amsterdam and other cities, much as the Huguenots were expelled from France.

Although the people became essentially Catholic, the Bohemians were always very restless under Austrian domination. In 1848, the year of revolutions, the Bohemians rose, but did not succeed at this time in accomplishing much. Bohemian discontent manifested itself again in 1859, but the country remained a province of Austria until the close of the Great War. In the royal castle at Prague resides the first President. Bohemia free! What miracle has been wrought? Five years ago merely to contemplate it would have been considered treason to Austria. The people have good common-sense. They will not go to extremes to express their joy, but already reforms in Church and State are in progress. There is an eight-hour day; there is to be impartiality as to churches; all titles of nobility are abolished. When the news of liberation was received the priest in a Slovak village began the cele-

bration by saying: "This is the day which the Lord has made." And all the people responded: "We will rejoice and be glad in it." Then they shouted: "Glory be to our liberator Wilson", and with bared heads they sang their beloved national hymn, Hej Slováci.

Geographically, Bohemia belongs with Saxony to the north. Its waters flow chiefly to the Baltic. It has about 20,106 square miles of territory, equivalent to that of New Hampshire and Vermont. The population in 1921 was 6,664,932, of whom 2,000,000 were Germans, 90,000 Jews, and the rest Bohemians. It is one of the most fertile regions in Europe. The plains produce the usual small grains, flax, hops, fruits, and vegetables in abundance. The mountains yield graphite, coal, copper, lead, tin, zinc, iron, silver, and building stone. Bohemian lace and ribbons are celebrated. During the winter, when there is no field work, the peasant women earn eighteen or twenty cents a day making lace. There are pottery and porcelain works. Bohemian cut glass is the finest in the world. The best test tubes, graduates, and other laboratory glassware are obtained from Bohemia. It rivals Bavaria in the production of beer.

See PRAGUE; AUSTRIA; HUSS.

Boiler, the vessel in which steam is generated to be used for power or heating purposes. There are several characteristics of a well constructed boiler: (1) a large amount of surface must be exposed to the heat; (2) the material must be strong enough to resist enormous pressure; (3) the parts must not be likely to corrode and weaken; (4) the water must not be likely to leave any part of a heated surface bare; (5) the utilization of heat without waste. A discussion of the various forms of boilers is too technical for this place. In general, the first and fifth requisites are met by having the flames and heat pass through flues or tubes that lead through a cylinder containing water; or else the water is contained in tubes that are located in a firebox or heated chamber. Fire tube boilers are those in which the fire occupies the tubes; water tube boilers are those in which the water occupies the tubes. Boiler making is a branch of business quite distinct from engine building. Of 40,533 stationary boilers produced in the United States in the year of the last census, but 4,731 were water tube boilers. The total output of boilers for the year was worth about $26,000,000. Pennsylvania leads in the manufacture of steam boilers. See STEAM ENGINE; LOCOMOTIVE; SAFETY VALVE; WATT.

Boiling, the passing from a liquid to a gaseous state, when the temperature is sufficiently high so that bubbles of vapor form throughout the body of the liquid. It is thus distinguished from evaporation when the loss of liquid takes place at the surface only. When water is heated its temperature rises till (under ordinary atmospheric conditions) 212°F or 100°C is reached, beyond which there is no increase as long as the steam escapes freely. Bubbles form at the bottom of the vessel, grow in size as they ascend, thus agitating the whole mass of the liquid, when it is said to boil. On a mountain water boils at a lower temperature, illustrating the law that the boiling point varies with pressure. Potatoes, which require a certain temperature to break the starch grains, cannot be cooked by boiling in an open vessel on Pike's Peak, for instance; putting on a cover which causes an increase of pressure and thus of temperature, accomplishes the desired result.

Each liquid has its distinctive boiling point, the more common being: Ether, 35°C, Alcohol, 78°C, Turpentine, 159°C, and Mercury, 357°C.

Boise, Idaho, the capital of the state, is situated on the Boise River, and is served by the Union Pacific, the Oregon Short Line, and Boise Valley Interurban railroads. It is a beautiful place, with shade trees, broad streets, and fine residences. The city receives its hot water supply, both for domestic use and for heating business buildings, from natural boiling wells. Industrially and commercially, Boise is important. Its wool market is the distributing point for the neighboring country, and it is the leading horse market of the Northwest. The Arrowrock dam,

26 miles above the city, is (1923) the highest dam in the world, 351 feet. It supplies water for irrigation and manufacturing purposes.

Boise has fine public and private schools, public buildings, churches, banks and theatres. It was settled in 1834 by French-Canadians. Population, 1920, 21,393.

Bois-Guilbert, Brian de, bre-än de bwä-gïl-ber′, a preceptor of the order of Templars in Scott's *Ivanhoe.* He is a powerful, ambitious, passionate man, hard and cruel, the villain of the story. Scott draws a striking picture of Bois-Guilbert.

He is the unsuccessful suitor of Rebecca, the beautiful Jewess. Disguised as an outlaw he makes her his captive. When she is condemned to die as a sorceress he pleads with her to flee with him, but is repulsed. In the tournament at Ashby he enters the lists against Ivanhoe, Rebecca's champion, but falls dead at the beginning of the combat. "Unscathed by the lance of his enemy, he had died a victim to the violence of his own contending passions." See IVANHOE.

Bojer, Johann (1872-), a Norwegian novelist and playwright, one of the foremost literary figures of Scandinavia. Born at Drontheim, he supported himself by commercial work while studying at the local Latin school. His first play, *A Mother,* won him a scholarship. Bojer studied in Paris, Berlin and London, and in 1895 published his first novel, *Helga.* The merit of his work was quickly recognized, and though he has sometimes been criticized for his bitterness, he has often been praised for his sure insight and for his fluent style. Some of Bojer's works have been translated into French and some into English. His most important works are *The Great Hunger,* novel; *The Power of a Lie,* novel; *The Eyes of Love,* play; *White Birds,* short stories; and *Our Kingdom,* novel.

Bok, Edward William (1863-), a well known American journalist who was was for many years editor of the *Ladies' Home Jourial,* was born at Helder, Holland. His parents emigrated to the United States in 1869, and Mr. Bok attended the public schools of Brooklyn, N. Y. He secured work as an office boy, and at seventeen was editor of *The Brooklyn Magazine.* After several years' work as a stenographer for New York publishing firms, he founded the Bok Syndicate Press, which furnished special articles to newspapers. In 1887, Mr. Bok edited *The Beecher Memorial,* and in 1889 became editor of the *Ladies' Home Journal,* retiring in 1919. He was chosen vice-president of the Curtis Publishing Company in 1891. Mr. Bok is a public spirited man in the highest sense. Among the causes that he has wholeheartedly supported are the better babies movement, the campaign against harmful patent medicines, and against the old unsafe Fourth of July celebrations. In his autobiography, *The Americanization of Edward Bok,* he has delightfully told the story of his life.

Bokhara, a state in Central Asia, since August, 1919, known as the Bokharan People's Soviet Republic. It is bounded on the north by the Russian provinces of Syr-Daria and Samarkand, on the east by the province of Ferghana, on the south by Alfghanistan, and on the southwest by the Russian Trans-Caspian province and the Khanat of Khiva.

The modern state of Bokhara dates its existence from the fifteenth century, when it was founded by the Usbegs after the Golden Horde had been crushed by Tamerlane. The present rulers of this little country belong to the Mangut dynasty, dating from the eighteenth century. After 1873, Bokhara was virtually a dependency of Russia, with whom the present republic has a political and military agreement.

Bokhara has an area of 79,000 square miles, and a population of approximately 3,000,000. The capital is the town of Bokhara, with a population of about 75,000. The next largest town is Karshi, population 25,000. Almost the entire population worship Mohammed.

The country produces corn, fruit, silk, hemp, cotton and tobacco; and goats, sheep, horses and camels are raised. Its mines yield salt, alum, sulphur and gold. Bokhara exports to India about 34 tons of raw silk annually, and from the same country imports quantities of tea each year.

Boleyn, bo͝ol′in, **Anne** (1500-1536), a queen of England. She was well born, and resided for a time at the French court. Later she became lady of honor to Queen Catherine. She was celebrated for her beauty and her wit. Henry VIII became infatuated with her and about the same time became convinced that his marriage with Catherine was illegal. At all events, marry Anne he would and did; after which there was nothing for his Archbishop Cranmer to do but to declare the first marriage void and the second legal. In a similar manner Anne was supplanted by her own maid of honor, Lady Jane Seymour, and was herself condemned to the scaffold on a harsh charge—probably trumped up—of infidelity. Henry, it is said, went hunting with a gay party. The boom of a distant gun notified him that his cruel orders had been carried out. Before execution, Anne, it is said, sent for the wife of the lieutenant of the Tower, fell on her knees, and said, "Go to the Princess Mary," meaning the daughter of Catherine, "in my name, and in this position beg her forgiveness for all the sufferings I have drawn upon her and her mother." Elizabeth, the famous Virgin Queen, was the daughter of Henry and Anne Boleyn.

See HENRY VIII.

Bolingbroke, Viscount Henry St. John (1678-1751), an English statesman, was born at Battersea, in Surrey. In his youth he lived a dissipated life, but when he entered Parliament in 1701 he devoted all his time to politics, joining the Tories, and gaining an enviable reputation as an orator. In 1704, he was made Secretary of State for War, holding office until the Whig defeat of 1708. He retired and engaged in study; but after the Whig defeat of 1710 he was made Secretary of State for Foreign Affairs. In 1712, he was called to the House of Lords, and in 1713 concluded the unpopular Treaty of Utrecht. On the accession of Geroge I., Bolingbroke's power declined. He was deposed in 1714, and in 1715 he went to France, In August of the same year he was attainted. James III, the Pretender, invited him to Lorraine, and made him his secretary of state. But upon the death of Louis XIV Bolingbroke, despairing of the success of the Pretender, repented of having entered into so close an arrangement with him. Whatever his feelings and plans, he was at least honest in his intentions with regard to James III, despite which the latter deprived Bolingbroke of his dignity and transferred it to the Duke of Ormond. So, as it happened, Bolingbroke was charged with treachery by both the King and the Pretender. In 1723 the Parliament hostile to Bolingbroke was dissolved, and he was permitted to return to England. His estates, however, were not restored until two years later by act of Parliament. He went to France again, where he wrote his *Letters on the Study and Use of History.*

Bolivar, bŏl′ĭ-var, **Simon** (1783-1830), a Venezuelan patriot, soldier, and statesman. He came of excellent Spanish ancestry. He was born at Caracas. He studied in Spain, resided in Paris, married in Madrid, and settled down in his native South American home. He had studied the French Revolution at first hand in Paris, the Spanish aristocracy at first hand in Madrid, and was well read in the history of the American Revolution. The countries of the Andes from the Caribbean Sea to the Strait of Magellan were in the possession of Spain, and were managed for the benefit of the home country. Bolivar threw himself into a secret movement to foment revolution. July 5, 1811, Venezuela declared its independence and Bolivar was made commander-in-chief of the revolutionary army. For ten years the tide of war raised him to the pinnacle of success or left him in the depths of despair. He won notable victories and suffered defeats that would have crushed an ordinary man. Five times he was obliged to fly the country and five times he returned to reorganize the opposition. In 1821 he was made president of the new republic. Not satisfied with the independence of his native land, he aided Peru and Ecuador with men, money, and personal presence, until in 1824 the power of Spain in the northern Andes ceased. When the provinces of upper Peru organized as an independent country they took the name of Bolivia in commemora-

tion of his services. Bolivar died young, only forty-seven, but full of honor. In South America he is called the Great Liberator. His statue stands in the public square of each large city that children may ask who he was and learn what he did for his country.

Bolivia, a republic of South America. It is situated in the Andean region north of Argentina and west of Brazil. Since 1878 it has been cut off from the Pacific by the seizure of the coast region by Chile. The area is estimated at 514,155 square miles, somewhat greater than that of all our Atlantic seaboard states combined. It is convenient to think of the country as divided into three physical regions. They are: The southern half of Lake Titicaca and the plains that lie about it; the mountains that pen in this basin on all sides; and a third region east of the Andes. Lake Titicaca is 12,505 feet above the sea. It drains an area 500 miles in length by 100 in width but it has no outlet save a stream that runs southward at times for 150 miles or so and loses itself in shallow salty lakes. The surrounding mountain chains are among the grandest in the world, rivaling the Himalayas. A railway from the coast climbs through a pass 14,765 feet high to reach the valley. The region has large mineral wealth. The silver mines of Potosi were long reckoned the richest in the world. They have yielded first and last over $2,000,000,000. Bolivia yet ranks fifth among the silver producing countries. There are rich mines of gold, tin, bismuth, copper, iron, and lead. Marble, sulphur, borax, and asphaltum are found in abundance. Beautiful emeralds, topazes, amethysts, and opals abound. Roads are wanting. Files of surefooted mules or llamas thread the passes, packing supplies and the products of the country. La Paz and Sucre, the largest towns, are the centers of mining districts.

Although reputed as a mountainous, mineral-producing country. Bolivia has grazing districts equal to Texas, agricultural plains rivaling Kansas, and forests exceeding those that once covered the Ohio Valley. Its territory extends eastward from the Andes for a thousand miles into the basins of the Amazon and the Paraguay. Forests of rubber trees, cedar, mahogany, and dyewoods stand waiting for future railways.

A small part of the population is of Spanish descent, a second element is descended from the people once governed by the Incas and subdued by Pizarro. The great majority belongs to unrelated Indian tribes unacquainted with each other and practically unknown to the world. Agriculture is carried on in the most primitive way. A pole laid across the heads of the oxen just behind the horns, and lashed to them by strips of cowhide, serves as a yoke. For a plow, a pole with a hook at one end is lashed to the yoke. A flat piece of iron is lashed to the hook. After the ground has been scratched by this primitive contrivance, it is pulverized and harrowed by dragging a beam or tree top over it. The undeveloped capacity for grain, vegetables, hay, fruit, sugar, rice, coffee, beef and dairy products, wool, and mutton is said to be incredible.

The principal exports are precious metals, gems, rubber, cocoa, coffee, and wool. The chief imports are cloth and clothing, hardware, and machines.

The Catholic faith is the recognized religion of Bolivia. Nearly all the people, Indians included, belong to this church, though others are unmolested. La Paz, the capital, has 107,252 people. There are less than a thousand schools in the entire country. Perhaps we cannot sum up conditions in Bolivia better than by saying there is a small, reasonably intelligent, Spanish element, with colleges, libraries, telegraphs, and newspapers, but that nine-tenths of the country, or even more, is in the condition of an American Indian reservation.

STATISTICS. The following are the latest reliable statistics available:

Land area, square miles	514,155
Population	2,889,970
Indian	920,864
White	231,088
Chief Cities:	
La Paz	107,252
Oruxo	31,360
Cochabamba	31,014
Sucre	29,686
Number of departments	8

Members of state senate	16
Members of chambers of deputies	70
National revenue	$16,000,000
Bonded indebtedness	$22,675,985
Farm area, acres	4,940,000
Rubber plantations, acreage	40,642,000
Output of tin, tons	72,500
Output of copper, tons	32,500
Imports	$20,000,000
Exports	$55,000,000
Miles of railway	1,354
Teachers in public schools	3,960
Pupils enrolled	54,192

Bologna, bō-lōn'yä, an Italian city, the capital of the province of the name. It is situated in the valley of the Po at a point where important routes of traffic of the Apennines converge. It is still surrounded by a high brick wall pierced by twelve gates, admitting as many routes of travel. The streets are narrow, crooked, and clean. The upper stories of the houses project, and are supported by columns forming arcades for foot passengers. In the Middle Ages Bologna was a city of importance. Its merchants were men of influence. Its university was the earliest in Europe and was for a time the most renowned institution of learning in Italy. Galvani, for whom the galvanic battery is named, was a professor here, 1789. The medical department was the first in the world to teach anatomy by means of dissecting. It seems ridiculous that a city noted for learning, a city on which sculptors and painters have conferred renown, a city with 130 churches, a library of 200,000 volumes and 800 manuscripts, art galleries and museums, a city hall, and with a present population of 189,770 and large commercial and manufacturing interests, should be known in the western world chiefly as the home of the bologna sausage. See ITALY.

Bologna University. See BOLOGNA.

Bolognese School of Painting, a name usually applied to the school which was founded by the Carracci at Bologna about the year 1580, also called the Eclectric School. This school was the forerunner of the modern schools of design. It united the principal points of the Italian Renaissance schools, and tried to imitate the chief characteristics of Titian, Correggio, Raphael and Michelangelo. It therefore came to pass that the school lacked originality in color as well as in design. Much weight was also placed upon the study of nature. The foremost representatives of this school of painting were Guido, Carracci, Giovanni, Domenichino, Albani, Francesco and Guercino.

Bolometer, a sensitive instrument invented by Professor S. P. Langley to enable him to detect minute changes in temperature, especially those due to absorption of radiant energy, and to take note of the quantities of energy absorbed. His first use of this instrument was in his investigations on the radiation from the sun. Later it was used in Langley's Astrophysical Observatory at the Smithsonian Institution, Washington, and elsewhere. The instrument is one of the most useful and reliable instruments yet invented for the study of radiation.

Bolsheviki, the name of the party in power in Russia since the revolution of 1917, means, literally, "the larger," and was applied to distinguish the majority group of the old Russian Social-Democratic Party from the minority group, or Mensheviki. From this, then, the term Bolshevism derives. The Bolsheviki base their fighting tactics and their governmental methods upon three fundamental ideas not of purely Russian origin. In fact, the first and most powerful expression of modern Communism was voiced as long ago as 1847, when Marx and Engels issued the Communist Manifesto. The three fundamentals, as recast by the Bolsheviki in order to be made applicable to Russian problems are: The conquest of society by the proletariat class, the power of revolutionary instinct, and the dictatorship of a compact minority. The cry, "All power to the Workers' and Soldiers' Deputies," now so well known, is based upon the first named of these ideas. The last named arises out of militant syndicalism as developed in France. One of the world's leading exponents of Marxist doctrines, Kautsky, pointed out the fact that the Bolsheviki's dictrine was compounded of conflicting elements, in that, since the Bolsheviki was a Socialist group, it had to fight and crush other Socialist groups in order to gain and hold power, and was finally compelled to adopt the

name Communist in order to be distinguished from other Socialist groups.

Upon their accession to power in November, 1917, Lenine, Trotzky, and other leading Bolshevists found a tool ready made that served their purposes admirably. This tool was the soviet, or committee, created by the March revolution. It was to the soldiers and peasants, through these committees, that Lenine addressed his pleas for working class solidarity of a militant kind.

As organs of appeal to the peasantry, whom Lenine told of the fact that 297,000,000 acres of Russian land were owned by a powerful minority group, the soviets functioned more or less well. But the Bolsheviki leaders in Moscow found that one of their greatest problems was to get the very peasants to whom they gave land, to cooperate with the city workers and the army in the matter of furnishing food and other farm produce. The peasantry was—and is—extremely ignorant, a condition due to centuries of the worst oppression; and their reluctance to cooperate with the Bolsheviki in Moscow is due, it is thought, largely to this fact. They had been given land, and land was what they wanted; therefore the necessities and intrigues of the city were none of their concern.

The Bolsheviki have been censured for their acts in Russia and out of Russia in the most bitter terms since the day they seized power. They have dispossessed the landed gentry, have taken over and are attempting to operate the industrial plants, have reshaped the educational system, have removed the Czar and his famly by execution, have abolished religion and appropriated to the state all church property, and have created a powerful army.

There have been times during the Bolsheviki regime when utter collapse and consequent chaos seemed the only things in store for Russia, and yet the immense vitality of the people and the shrewdness of the leaders have enabled her to continue in existence. Famine, cold and disease have worked awful havoc from one end of the land to the other; and even now the Bolsheviki representatives in other lands are pleading for economic assistance, in order that some semblance of stability may be attained. Russia's future, and therefore the future of the Bolsheviki, is still in doubt. See RUSSIA.

Bombardier Beetles, ground beetles of the genus *Brachinus.* In color they are black, blue or green, and have reddish-yellow legs. They live on the surface of the ground, and when pursued discharge from the anus a drop of fluid, with an explosive sound, which changes into a smoke-like gas when coming into contact with the air. This enables the beetle to escape from its pursuer before it has recovered from its astonishment. There are more than 25 species of these beetles in the United States.

Bombay, bŏm-bā′, an important commercial city and seaport on Bombay Island, situated on the western coast of Hindustan. Latitude, 18° 53′ N., longitude, 72° 52′ E. Bombay is the second city of British India in point of size and importance, and lies nearest to the Suez Canal. The harbor is one of the largest and best in the world. The island has been connected with the mainland by a causeway. Docks, harbor facilities, public buildings, street railways, electric lights, enormous goods depots, and hotels give the city an imposing water front. It is the western terminus of the Indian railways. The Victorian station cost $15,000,000, and is one of the finest structures of the kind in the world. A university and numerous fine churches give travelers an impression that Bombay is a European city. The surrounding scenery is bold and striking. The leading article of export is cotton, though a hundred mills are now engaged in spinning. Bombay is to a large country, an empire in fact, what New York is to the United States.

The British acquired the island of Bombay from the Portuguese in 1661. It was the second British possession in India, Madras being the first. The population in 1921 was about 1,172,953. Though under British control, the people are largely Hindus or Mohammedans, with about 60,000 Parsees. Their religious views are often responsible for occurrences which seem strange enough. For instance, a shipment of animal crackers was reject-

ed on the score that the religion of Mohammed forbids images. Another peculiarity, indicating lack of haste in methods of doing business, is the newspaper service. The price of the leading morning newspaper in Bombay, delivered by mail, is sixty-six cents a month, but if a subscriber will take it from a carrier who delivers it at seven o'clock and will read and return it when he calls again at eleven o'clock, the price is only fifty cents a month. If the subscriber is willing to wait for his morning paper until four o'clock in the afternoon, he may have it at that hour and return it to the carrier the next morning for thirty-three cents a month. Or, if he likes to keep his old papers, he may wait until the next morning after publication, have his paper for thirty-three cents a month, and be under no obligation to return it at all. Thus the same paper may be circulated through three different households and the total revenue therefrom will amount to one dollar and five cents per month.

Bombazine, bŭm-bà-zēn′, a twilled dress fabric of which the warp is silk and the weft worsted. The name is from a Greek word signifying silk. Bombazine is somewhat wiry, and has a changeable, lustrous appearance due to the play of light on the different threads in its surface. It has been known in England since the time of Elizabeth. Bombazine has been made in colors, but it is usually black. It is worn by certain religious orders in Spain and South America, and is the material of the Spanish mantilla. Bombazine was at one time a favorite material for mourning gowns.

Bonaparte, or **Buonaparte,** a noted Italian family. There were several branches, one of which established itself in the island of Corsica and has been rendered famous by the achievements of Napoleon Bonaparte. A branch of the Bonaparte family resides in Baltimore, Maryland. The story of the origin of the family name from *Mons Boni* is told well by T. A. Trollope in his *History of the Commonwealth of Florence:*

About four miles to the south of Florence, on an eminence overlooking the valley of the little river Greve, and the then bridle-path leading towards Siena and Rome, there was a very strong castle, called Monte Boni, Mons Boni, as it is styled in sundry deeds of gift executed within its walls in years 1041, 1085, and 1100, by which its lords made their peace with the Church, in the usual way, by sharing with churchmen the proceeds of a course of life such as needed a whitewashing stroke of the Church's office. A strong castle on the road to Rome, and just at a point where the path ascended a steep hill, offered advantages and temptations not to be resisted; and the lords of Monte Boni "took toll" of passengers. But, as Villani very naïvely says, "the Florentines could not endure that another should do what they abstained from doing." So as usual, they sallied forth from their gates one fine morning, attacked the strong fortress, and razed it to the ground. All this was, as we have seen, an ordinary occurrence enough in the history of young Florence. This was a way the burghers had. They were clearing their land of these vestiges of feudalism, much as an American settler clears his ground of the stumps remaining from the primeval forest. But a special interest will be admitted to belong to this instance of the clearing process, when we discover who those noble old freebooters of Monte Boni were. The lords of Monte Boni were called, by an easy, but it might be fancied ironical, derivation from the name of their castle "Buoni del Monte"—the Good Men of the Mountain;—and by abbreviation, Buondelmonte, a name which we shall hear more of anon in the pages of this history. But when, after the destruction of their fortress, these Good Men of the Mountain became Florentine citizens, they increased and multiplied; and in the next generation, dividing off into two branches, they assumed, as was the frequent practice, two distinctive appellations; the one branch remaining Buondelmonti, and the other calling themselves Buonaparte. This latter branch shortly afterward again divided itself into two, of which one settled at San Miniato al Tedesco, and became extinct there in the person of an aged canon of the name within this century; while the other first established itself at Sarzana, a little town on the coast about half-way between Florence and Genoa, and from thence at a later period transplanted itself to Corsica; and has since been heard of.

Bonaparte, Napoleon. See NAPOLEON.

Bond, in its origin the word bond is the same as band, and means that which fastens or secures. It has come to be used with various significations, most of which the dictionary explains sufficiently. In common business parlance a bond is an instrument issued by a government or corporation for the purpose of borrowing money. Government bonds are equivalent to inter-

est bearing notes, that is, they are promises by the government to pay certain sums of money on or before the time specified in the bond and at a specified rate of interest. Bonds issued by a corporation are equivalent to mortgage on its property. If a corporation lacks funds for carrying on its business and does not care to issue more stock, it may issue bonds payable at a specified date, with interest at a specified rate, and authorizing the sale of the property for the maintenance of which the borrowed money is to be used, should the company fail to fulfill the conditions.

In law a bond is an obligation in writing to do or not to do some specified thing. The bond may be simple, that is, a promise merely, or it may be conditional, that is, a promise to be fulfilled only in case some other specified condition be fulfilled. That bonds must needs be executed with care, and are capable of variety of interpretations, is illustrated in Shakespeare's comedy *Merchant of Venice,* when Portia disguised as a "learned doctor" saves Antonio's life by her clever interpretation of that which is "nominated in the bond."

Bone, the material of which the skeleton or framework of vertebrate animals is composed. Calcium or lime, carbon, phosphorus, and magnesium are the principal mineral elements. The name is also applied to the single parts. For instance, the human skeleton contains about 200 bones. It is well to distinguish bone from ivory, whalebone, and horn, which are only modifications of the skin. The antlers of the deer kind are of genuine bone. Live bone is intersected by numerous canals through which blood vessels find their way. In the arts bones of cattle, horses, and other animals are used for a variety of purposes, such as knife handles, combs, buttons, etc. Bones are converted also into glue, lampblack, and animal charcoal. Pounded bones are excellent food for poultry, furnishing the necessary material for egg shells. Bone dust is an excellent fertilizer on account of the phosphate of lime it supplies. Boneblack, obtained by charring bone, is used for filtering purposes by the sugar refiner. It is also a disinfectant.

In literature a number of peculiar expressions have sprung up, possibly from the wrangling of dogs over bones, as "a bone to pick," "bone of contention," "to make no bones of," "without more bones." An emaciated horse or other animal is called a "bag of bones." A bone of the elbow particularly sensitive to blows is called the crazy bone or funny bone.

See SKELETON.

Boneblack. See CHARCOAL.

Boneset, or **Thoroughwort,** a stout, hairy, strong-scented herb. A member of the composite family closely related to Joe Pye weed. Boneset is a flat-topped plant about two feet high, with white flowers. It grows in moist meadows, copse edges, or old pastures and may be known by the lanceolate, warty, finely-toothed opposite leaves, so united at the base that they seem like one leaf with the stalk of the plant growing up through the middle of it. A bunch of dried boneset for an all around spring medicine used to hang in every well ordered attic. Boneset was in evidence if occasion arose at any time; but regularly in March or April it was customary to steep a jar full of the bitter stuff, of which each member of the family, well or ill, was invited, exhorted, urged, and required to partake freely "to clear his blood." See MEDICINE.

Bonheur, bō-nèr or bŏ-nur′, **Rosa** (1822-1899), a distinguished French artist. She inherited her talent and received instruction from her father, an artist of Bordeaux. From the first, pictures of animals were her forte. *Goats and Sheep,* and *Two Rabbits* were the first to attract attention. In 1855 the *Haymaking Season in Auvergne* was shown at the Universal Exposition in Paris, and *The Horse Fair* was exhibited in London. The latter is the picture by which Miss Bonheur is known in America. She was anxious that it should be owned by her native city and offered it to Bordeaux for $6,000. She afterward sold it in London for $20,000, and subsequently it was bought by Cornelius Vanderbilt for the Metropolitan Gallery of New York. Rosa Bonheur was a woman of fine appearance. She is said to have gone about fairs and markets dressed

in a man's clothes to escape observation. This was one way she had of studying horses at first hand. In 1892 she sold a picture of *Horses Threshing Corn* for $60,000. Ten horses are shown in life size, making the largest animal picture ever painted. Her admirers were naturally enough sporting characters, but there can be no doubt of her genius in this kind of art. "No jockey knew a horse better than she." Her study was at Fontainebleau, France. During the siege of Paris, 1870-1, strict orders were issued to the German soldiery not to molest the home of Rosa Bonheur.

Bonhomme Richard. See JONES, JOHN PAUL.

Boniface, bŏn′e-făss (680-755), "the apostle of Germany." He was born in Devonshire, England, (?) and known at first as Winfrid. He threw himself into a movement for the conversion of the pagan Germans to Christianity. He traveled extensively, preaching, converting, and turning pagan temples into Christian chapels. He founded churches in Bavaria, Thuringia, Hesse, Saxony, and Friesland. Pope Gregory made him archbishop of all Germany. One means of holding the country for Christianity was the establishment of monasteries and convents, which he filled with monks and nuns from England and Ireland, on the same principle that Hull House has been established in Chicago. In 732 Gregory III made him archbishop of Germany. At the end, Boniface was preaching the gospel in Friesland and was set upon by a heathen mob there. He and his congregation of converts were killed. His bones were buried at the Abbey of Fulda, the most famous of his foundations, where relics of the venerable archbishop are yet to be seen. The most striking incidents in his life are connected with the destruction of an oak at Geismar sacred to Thor and an idol named Stuffo on a summit of the Harz, still called by the name. A number of popes have taken the name of Boniface. The term is akin to benefactor and means well doing.

Boniface, the name of a landlord in an old English play, whence the frequent use of boniface in the sense of an innkeeper. Boniface was in league with highwaymen. His inn was famous for good ale.

Bonn, bŏnn, a university town of western Prussia. It is pleasantly situated on the west shore of the Rhine about twenty miles above Cologne. Bonn had in 1919 91,410 inhabitants. It is the site of an old Roman fortification, and derives not a little historical importance from having been the seat of the electors of Cologne. During the Middle Ages Bonn suffered a number of destructive sieges. The old walls were leveled in 1717, and the moat was filled up to make way for boulevards. The city hall and the market are characteristic. The chief interest of the city centers in the university. In enrollment Bonn ranks fourth in the empire. The principal building is a former palace of the elector. The library contains about 275,000 volumes and many valuable manuscripts. There is a valuable museum of Roman antiquities. Albert, the prince consort of Queen Victoria, was educated here. In his day it was the resort of the young protestant princes of all Germany. Many Americans studied at Bonn. Among the noted professors Niebuhr and Schlegel are named. A statue of Beethoven, who was born here, stands in a public place.

Bonner, Robert (1824-1899), an American publisher. He was born near Londonderry, Ireland. He came to America at the age of fifteen. He learned the printer's trade in the office of the *Hartford Courant,* where tradition runs that he was the fastest typesetter ever in the office. As soon as he had saved a little money he established the *New York Ledger,* a weekly literary paper. He advertised widely and paid enormous prices for contributions. He gave Henry Ward Beecher $30,000 for a novel, *Norwood;* Tennyson $5,000 for a short poem, and Dickens $5,000 for a short story. He kept a number of serial stories running and spent thousands of dollars, sometimes $25,000 a week, in spreading broadcast sheets containing portions of tales, always breaking off at an intense moment with the announcement that the continuation might be found in the *New York Ledger* of such

a date. Before one story ended another began. The subscriber was kept in tow by the desire, ever renewed, to get the rest of some story that had taken hold of him. The *Ledger* brought Mr. Bonner a fortune.

Bonner's son was graduated by Princeton University. The noted publisher, always a liberal citizen and a staunch Presbyterian, was accosted at commencement dinner by Doctor McCosh, the president, with "Weel, Mr. Bonner, we've graduated your son, what can you do for the college?" Mr. Bonner responded with a liberal gift.

In 1887 Bonner retired from active business. He was a quick, intense man and was fond of speedy horses. He had an ambition to own the fastest trotter in the world. As soon as a fast animal appeared he bought it and took it from the race-track for his private buggy. He paid $35,000 for Dexter; $36,000 for Rarus; $40,000 for Maud S., and $41,000 for Sunol. It is estimated that his driving horses and stables cost him first and last $1,000,000.

Bonnet, a head covering. It was originally the name of a woolen stuff of which a bonnet was made. In Scotland the name is applied to a rimless woolen cap worn by men. There are several styles, as the Glengarry, the Balmoral, the Braid Bonnet, and the Kilmarnock, or Tam-o'-Shanter. These are still worn by various Highland regiments in the service of His Majesty. *Chambers's Encyclopedia* thus describes the bonnet of the Scottish peasant:

> The genuine old bonnet of the Lowland Scottish peasant was of a broad, round, and flat shape, overshadowing the face and neck, and of a dark-blue color, excepting a red tuft like a cherry on the top. The fabric was of thick milled woolen, without seam or lining, and so exceedingly durable that, with reasonable care, a single bonnet worth about two shillings would have served a man his whole life. No headdress ever invented could stand so much rough usage. It might be folded up and put in the pocket, or laid flat and sat upon, with equal impunity; it might be exposed to a heavy drenching rain without the head being wetted, and when dried, it was as good as ever. Besides, it could be worn on the top of the head, or slouched in front, behind, or sidewise, as a protective against a cold blast; and from its softness and elasticity, it very fairly saved the head from the effects of a blow. In short, there was no end to the adaptability of the old "braid bannet," as the Scotch termed it; and one almost feels a degree of regret that, in the progress of fashion, it should have gone so much out of use.

With the exception of these Scottish bonnets, the word is not applied at present to head coverings worn by men. As an article of woman's attire, the bonnet is not to be distinguished from the hat by the drawing of any hard and fast lines; although no woman would ever make the mistake of calling a hat a bonnet or a bonnet a hat. Generally speaking, we may say of a bonnet that it is small and brimless; that it is set well back on the head, and is tied beneath the chin with ribbons; that it is worn by infants and elderly ladies only. Bonnets, however, may be large; they may be set squarely on the head; they may have brims; they may be without ties; they may be worn by women of any age; and they are still bonnets. Like hats, bonnets may be made of any material, and decorated to suit the taste and the pocketbook of the wearer. Shaker bonnets of straw, and sunbonnets, usually of quilted cloth, are familiar articles of headdress. See HAT.

Booby, a sea bird of the gannet kind allied to the pelican and cormorant. It is found on subtropical coasts as far north as Cape Hatteras. It is a bird of powerful wing and lives on fish, which it takes by pouncing down on them. It is frequently forced to surrender its prey to the frigate or man-of-war bird,—a pelican-like bird that ought to fish for itself. The booby nests on islets from Florida southward, laying a single egg in a low nest heaped with seaweed. It has a name for stupidity on account of the unsuspicious way in which, formerly at least, it allowed sailors to approach its nest or to knock it over with a stick. See BIRD; CORMORANT.

Book, a collection of written or printed sheets bound together. The name is derived from beech, having a reference to the white beech tablets on which the English monks wrote their books. Our book-making is developed from the art of the

Egyptians, who, in turn, derived their notions from the Babylonians. The Egyptian book was written on squares of papyrus, glued into long sheets. A book was preserved by rolling it up on a staff, and inclosing it possibly in a case. The title was written on a tag dangling from one end of the staff. If a work were long, it was written in two or more rolls or volumes. The use of papyrus was succeeded by that of parchment or the tanned skins of beasts. Charlemagne had been dead a hundred years before cotton paper was invented. Linen paper was introduced about the beginning of the twelfth century.

Paper was made at first on hand frames about as wide as could be held in the outstretched hands. A sheet made on such a frame as this was called a folio, if folded once; if folded again into four leaves, it became a quarto; into eight leaves, an octavo; into twelve, a duodecimo, etc. Now that machinery is in use and the sheet has no fixed or even approximated size, it is customary to give the size of books in inches. Books were formerly much larger than they are now. An atlas of the fifteenth century in the British Museum is over seven feet high. When standing on end, it readily conceals a man between its pages. Other old books in European libraries are almost as large.

So far as known, the first book printed from metal type is the so-called Mazarin Bible. It bears no date, but is supposed to have been issued between 1450 and 1455. There are twenty copies in various libraries. The oldest dated book was printed at Mentz in 1457. In the earlier days of printing fifty or one hundred copies were an ordinary edition. A printer took great chances in printing three hundred copies. In the latter part of the nineteenth century the American publisher of the old blue-back Webster's spelling book printed over a million copies annually to supply the demand.

The earliest booksellers were the scribes who copied manuscripts and offered them for sale. One who was well established in business not infrequently kept a number of scribes at work in his shop. A list of rolls prepared by them was to be found posted up on his door. A business of this sort could be carried on only in a city like Rome, or in the vicinity of a university. The earlier printers of books offered their own publications for sale, and later appointed agents at the various institutions of learning. The university authorities of the Middle Ages found it advisable, so they thought, to license booksellers in order that books might not be sold to irresponsible persons and carried away from the university into distant regions, where they would be inaccessible.

It would be difficult to form a trustworthy estimate of the number of books now published annually. In the United States alone, new books, including new editions, are published to the number of perhaps 10,000 a year. The exact number for 1921 is given at 8,329. As to classification,—fiction, law, theology, education, and juvenile books rank in the order named. The American people pay out $50,000,000 a year for books. This is considered unprecedented, but, after all, it is less than one dollar per inhabitant.

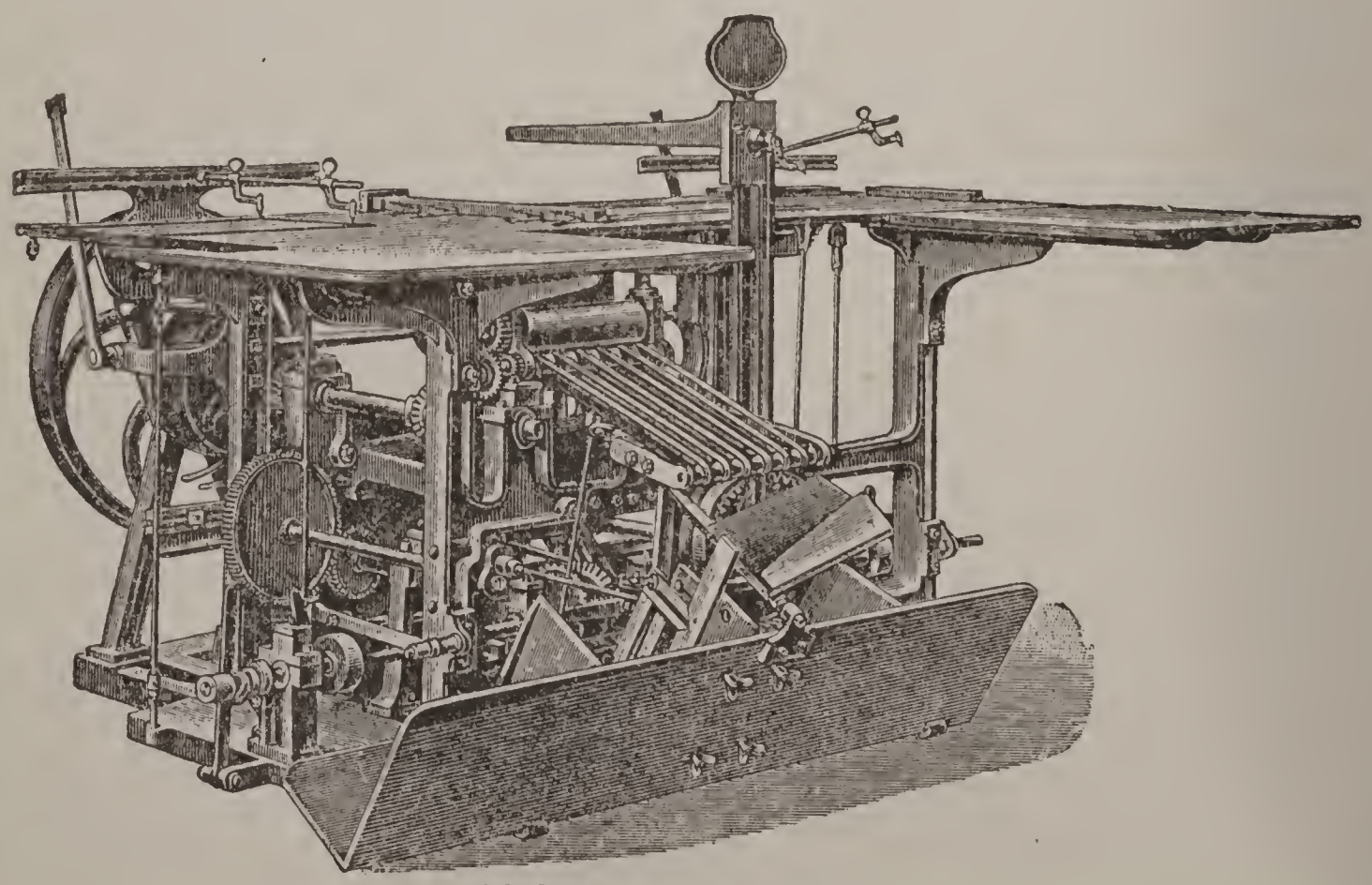
Book-binding, the art of fastening together the sheets of paper forming a book and securing them in a cover. The process is interesting. From the printer a book goes to the binder in the form of flat sheets containing usually thirty-two pages. These are first folded by hand or by machinery. The folded sheets are called "signatures." They are then "gathered" or arranged in order. A number of girls are seated around a circular revolving table, on which are piles consisting each of many sheets of the same signature. As the table revolves each girl takes one signature from each pile as it comes before her in order. After being "gathered" the sheets are subjected to strong pressure for several days. They are then ready for sewing. The back of each book as the pile of "gathered" sheets may now be called, is grooved or creased in three or more places by a special instrument. Into each groove is fastened a tape or cord, with several inches left loose at either end. To this tape the folded edges of each signature are sewed by machinery. Over this sewing

Italian Renaissance binding, leather with gold ornaments.

Saxon binding of sixteenth century, tooled leather.

Back, Italian Renaissance.

SOME CHOICE OLD BINDINGS.



Modern folding machine.

BOOK-BINDING.

strong glue is spread and allowed to dry. The back is now rounded by being hammered while held in a sort of a vise. Next, the edges are cut and treated in the various ways so familiar in different books, "sprinkled," "feathered" or "gilded." Often the front edges are left untrimmed; "uncut edges" as they are called, being popular in many high priced books. The cover is now put on. If a cloth binding is to be used, it is made complete of pasteboard, cloth, and paper, before being fastened to the book. If the binding is to be of leather, the boards are first fastened to the book, and to them the ends of the tapes to which the signatures are sewed, are securely fastened. Then the outside cover is pasted on. The book is now dried for several days in a powerful press.

Book-binding has been done in the past by hand, but is of course a slow process compared with the work of modern machines. Tools and presses have been devised in recent years by which book-binding on a small scale may be done in school or at home. It is pleasant work and has proved a source of income to ambitious boys and girls who rebind old books for their acquaintances, or put in a permanent cover some prized pamphlet or manuscript.

There are in the United States upwards of a thousand establishments for the binding of books and the making of blank books. The value of their combined products in 1920 was over sixty-six millions of dollars.

Bookkeeping, the recording of money transactions by a systematic method which will show receipts and disbursements for any specified time, and, in case of business houses, the extent and value of the business, and the actual returns for money invested. The simplest form of bookkeeping is an individual's private account of receipts and expenditures. Any boy or girl old enough to write and to have even small sums of money should keep an account-book. A blank book, the pages of which are ruled with one column at the left and two columns at the right, is most convenient. The column at the left is for the date of the transaction; the middle portion of the page records the transaction itself, that is, the purpose for which money is expended or the means by which it is obtained; the first of the right-hand columns is for the debit side of the account, that is, for amounts received; the second column for the credit side, or amounts paid out. Each month the amount of cash on hand should be entered on the credit side and the two columns added. If the footings are the same, the account balances, that is, it is correct, and a new page is begun with "cash on hand" as the first entry, the amount being entered in the debit column. A boy or girl who keeps such an account accurately to the year's end is not only preparing himself to learn more extensive bookkeeping easily, but is learning valuable lessons in the handling of money.

Among business houses there are two methods of bookkeeping in common use. They are called respectively single entry and double entry. Single entry bookkeeping involves the use of a cash book, a day book and a ledger. In the cash book are registered transactions which involve the receipt or disbursement of actual cash. The day book receives the record of every other transaction at the time it is made. These items are later transferred to the ledger, where the account with each person is entered on a separate page. Debts owing and debts owed must be balanced and comparison made with stock and cash on hand in order to ascertain the condition of the business.

Double entry bookkeeping is somewhat more involved, but furnishes a more complete record of the business. Cash book and day book are used as in the single entry system. From these the amounts are transferred to the journal, as the additional book required for double entry bookkeeping is called. Every transaction, however, is entered twice in the journal; it is entered on the credit side of one account, on the debit side of another account. Thus, if a grocer sold a barrel of flour for $6, his journal would show "cash" debited with $6 and "sales" credited with $6. The items from the journal are transferred to the ledger, posted, as it is called, these items being grouped under appropriate heads. The ledger is the final book of rec-

ord, and as every item is posted on both debit and credit side, the sum of the amounts in the debit column of the ledger must equal the sum of the amounts in the credit column. The double entry system is employed where business is done on an extensive scale. Often a business calls for the use of special books in keeping the accounts of various departments, and the manager extends or varies the system as necessity requires.

Book Muslin, a variety of muslin heavily starched and highly calendered. It is used for covering books, for linings, and similar purposes.

Book of the Dead, a collection of directions for the souls of the dead. It was compiled by the priests of Egypt—just when, it is impossible to say—but during the period of pyramid building, the period of the sphinx, say 4000-2000 B. C. The Book of the Dead was a "collection (ancient Egyptian) of prayers and exorcisms composed at various periods for the benefit of the pilgrim soul in his journey through Amenti (the Egyptian Hades), and it was in order to provide him with a safe conduct through the perils of that terrible valley that copies of this work, or portions of it, were buried with the mummy in his tomb. Of the many thousands of papyri which have been preserved to this day, it is perhaps scarcely too much to say that one-half, if not two-thirds, are copies, more or less complete, of the Book of the Dead."

When the soul was brought before Osiris, the Judge of the Dead, and was questioned as to his past life, the Book of the Dead gave him the answer his life on earth should enable him to make:

"I have not blasphemed; I have not deceived; I have not stolen; I have not slain any one treacherously; I have not been cruel to any one; I have not caused disturbance; I have not been idle; I have not been drunken; I have not issued unjust orders; I have not been indiscreetly curious; I have not multiplied words in speaking; I have struck no one; I have caused fear to no one; I have not eaten my heart through envy; I have not reviled the face of the king, nor the face of my father. . . . I have not ill-used my slaves; I have not killed sacred beasts; I have not defiled the river. . . . I have made it my delight to do what men command, and the gods approve. I have offered to the deities all the sacrifices that were their due; I have given bread to the hungry and drink to him that was athirst; I have clothed the naked with garments. . . . "

A similar declaration may be found in the "Repudiation of Sins" to be made before Osiris' forty-two assistants, the judges of the dead:

"Hail unto you, ye lords of Truth! hail to thee, great god, lord of Truth and Justice! . . . I have not committed iniquity against men! I have not oppressed the poor! . . . I have not laid labor upon any free man beyond that which he wrought for himself! . . . I have not caused the slave to be ill-treated of his master! I have not starved any man, I have not made any to weep, . . . I have not pulled down the scale of the balance! I have not falsified the beam of the balance! I have not taken away the milk from the mouths of sucklings! . . . There is no crime against me in this land of the Double Truth! . . .

"Grant that he may come unto you—he that hath not lied or borne false witness, . . . but who feedeth on truth, . . . he that hath given bread to the hungry and drink to him that was athirst, and that hath clothed the naked with garments; . . . his mouth is pure; his two hands are pure."

Bookworm, a name given to the grub of any one of several different beetles. A common bookworm of wide distribution is the grub of a beetle closely allied to the cinnamon-brown death-watch family, including the apple twig borer and the cigarette beetle. Bookworms are especially fond of old leather bindings, which they riddle with holes. A proverbial "bookworm" is a person who "always has his nose in a book," to the presumable extinction of all ability in so-called practical directions.

Boom, a Dutch word akin to beam. In a ship a boom is a long pole or a spar, jutting out from a mast to extend the lower edge of a sail. In Nelson's battleships the boom was from thirty to fifty feet in length, and was from six to fifteen inches in diameter at the larger end. In logging, a boom is a chain of logs fastened end to end, stretched across a river, or other body of water, to confine floating timber. When lumbermen desire to tow logs across a lake, they unload them on the ice and surround them with a boom. The boom is then chained to a tree on the shore. After the ice has gone

in the spring the boom is loosened from the shore. With its contents it may then be towed by a steam launch or dragged with a cable and windlass. When a number of sawmills are located near together, booms, enclosures, or slips are made by long lines of logs lying in the water parallel to each other. The logs for each mill are driven in at the upper end of the slip and float downward to the place where they are wanted. "Boom scale" is a lumberman's expression for the value of the logs safely in the boom.

Boomerang, a wooden missile now peculiar to the natives of Australia. It is made of some hard wood, and is usually about thirty inches in length and three inches in width. One surface is flat and the other is rounded. In shape it is curved like a crescent or scimiter. The native seizes his boomerang by one end and hurls it with great force and skill. There are several sorts of these instruments. Some are heavy and are used in war. Others are used in the chase of the kangaroo and in hunting birds, taking the place of the Indian bow and arrow. Other boomerangs again are used for amusement. The Australian native is skillful in throwing the boomerang, being able to kill game at a distance of two hundred paces. The curves executed by a baseball twirled from the hand of an expert pitcher are sufficiently surprising, but are far excelled by the right, left, up, and down curves of the boomerang. One sort may be thrown in such a way that it will execute curves in the air at a distance and return to the thrower. It may be made to circle a tree or house. One of the Australians at the Omaha Exposition threw his boomerang to a distance of ninety yards before it began its return flight, during which it rose to a height of forty-seven yards and described five complete circles, coming back and falling within two feet of the thrower.

On the theory that a careless thrower flinging his boomerang out in front of him is likely to be struck by the return of his own weapon, the term has passed into the newspaper reporter's vocabulary as synonymous for an ill advised argument or political charge which may be turned against the speaker or his party.

An ancient inscription represents an Egyptian noble standing in a boat and hurling a boomerang or "throw stick" at water fowl just rising from a clump of papyrus in the Nile. An Egyptian boomerang is preserved in the British Museum. The Moqui Indians of Arizona and New Mexico used a similar instrument in hunting rabbits. Of late a toy boomerang has been sold for lawn amusement.

Boone, Daniel (1735-1822), an American pioneer. His father had eleven children, and when Daniel was eighteen years old migrated from Pennsylvania to North Carolina, where he settled on the Yadkin. Young Boone was more of a trapper and hunter than a farmer. He became dissatisfied with North Carolina. In 1769 he headed a party of explorers, who penetrated the Blue Ridge Mountains and entered the present territory of Kentucky. Two years later, Daniel and his brother returned with as much peltry as their horses could carry.

In 1773 the two Boones, with five other families and forty riflemen, set out for Kentucky. They had many adventures with the hostile Shawnee Indians and engaged in pitched battles. In April, 1775, the party reached a point on the bank of the Kentucky River where they erected a stockade fort named for the commander, Boonesborough. This was the first white settlement in Kentucky. The Indians made every attempt to dislodge the whites, but without success. Boone was captured more than once. Most of the original settlers lost their lives in contests with the Indians, but, other settlers arriving, held the country. The most thrilling incidents known in Indian warfare are related in connection with the "dark and bloody ground," as Kentucky was called. Boone and his followers lived on the meat of the wild turkey, the deer, and the bear. They clothed themselves in buckskin and slept between robes made from the hide of the deer and buffalo. With a possible Indian behind each tree or lying in ambush in the near-

est canebrake, a light foot, a quick eye, and a sure aim were the successful settlers' chief reliance.

Boonesborough consisted of blockhouses protected by a stockade of tree trunks placed on end. During the Revolutionary War it withstood more than one siege in which the Indians were assisted by Canadians and renegade whites. In these pioneer times Boone was a stirring figure. Without him it would be safe to say the settlement of Kentucky would have been deferred many years.

When Kentucky was admitted as a state and lands became valuable, Boone lost all that he had through alleged defects in title. He was an unlettered backwoodsman, without knowledge of legal matters and without the means to prosecute his claims in the courts. With such of his family as had escaped the tomahawk of the Indian, he shouldered his rifle and led the way to Missouri, where he settled about forty-five miles west of St. Louis. Here his experience with titles was a repetition of that in Kentucky. He remained a few years and returned with enough peltry to pay off some Kentucky debts that had been troubling him.

In his old age some recognition of his services was tardily bestowed by Congress. He was a hunter as long as his strength permitted and ended his days in a hunter's cabin. In 1845 the remains of himself and wife were removed to the state cemetery at Frankfort. Boone was a born fighter, but, like Grant, left a reputation as a lover of peace and as a man of the utmost integrity. An ancient beech tree said to be standing on the banks of Boone's Creek near Jonesboro, Tennessee, still bears the illiterate inscription: "D. Boon killed a bar on tree in the year 1760."

See KENTUCKY.

Booth, Ballington, (1859-), the second son of William Booth. He was trained, as were General Booth's other children, to the work of the Salvation Army. For some years he was in charge of the work of that organization in America. He withdrew from the army, and in 1896 founded a new organization with similar aims and methods, known as the Volunteers of America.

Booth, Edwin Thomas (1833-1893), a celebrated American actor, was the fourth son of Junius Brutus Booth. He became associated with his father at an early age, and rapidly attained success. Following his father's example, he assumed Shakespearian roles, and gained a wide reputation. In 1861-2 he spent some time abroad playing and studying, and on his return he played in Hamlet at the Winter Garden in New York for one hundred nights. Although unfortunate in his financial enterprises, he ranks as one of the greatest and best-loved of American tragedians.

Booth, Junius Brutus (1796-1852), an English actor. After winning a reputation in Shakespearian tragedies in the Covent Garden Theater, London, he toured the United States, and finally settled down with his family at Baltimore. He was an unusually successful Iago, Shylock, and Hamlet, though Richard III was his favorite role. Several of his children have been noted actors.

Booth, Evangeline Cory, daughter of William Booth, was born and educated in England. She was in charge of field operations of the Salvation Army in England, later coming to Canada, where she remained in charge for 8 years. In 1898 she organized a party for the opening of the work in the Klondike. Her best work, however, has been done in the United States, which she began in 1904. Under her command the membership and finances of the Salvation Army in the United States increased greatly. She was recalled to England in 1922 by her brother, General Bramwell Booth.

Booth, Mrs. Maud Ballington, wife of Ballington Booth, was the daughter of a wealthy clergyman. She joined the Salvation Army when seventeen years of age. In 1887 she married Ballington Booth, and has worked ardently for the Volunteers of America since the founding of that organization. She is especially well known for her work in prisons and with released prisoners. She has won reputation as a lecturer, and is the author of *Branded* and of *Look Up and Hope.*

Booth, William (1829-1912), founder of the Salvation Army, known popularly as General Booth. He was born in Nottingham, England. He was reared in the Episcopal church, but later became a minister in the Methodist church. His work among the London poor began in 1865 in the East End, where he organized the Christian Mission. In 1878 this organization was given the name of Salvation Army, its object being the saving of both the bodies and the souls of men. General Booth believes that little can be expected from the spiritual nature of a hungry man. One distinctive feature of his work is known as "the ministry of all the talents," meaning that every member of the organization has some part in its work. When a human being is saved from poverty or sin, the next step in his upward progress is to teach him to reach forth a helping hand to save some one else. In 1890 General Booth published *In Darkest England,* a powerful book, descriptive of conditions among England's poor, and of the methods and plans of the Salvation Army for bettering these conditions and for suppressing evils of all sorts. General Booth visited the United States in 1894, lecturing and holding meetings in various cities. As a speaker on any other subject than that to which he devoted every power of mind and body, he would doubtless have been considered as mediocre, but when speaking of the human suffering caused by poverty and sin, and of his hopes and plans for its relief, his eloquence was unsurpassed.

Boots and Shoes, foot coverings made usually of leather. In colonial days the shoemaker went from house to house making up the family supply of footgear for the year. Each person had his own last. This custom was inherited from England and, indeed, was common throughout the whole continent. Somewhat later the shoemaker established a shop at which customers left their measures for whatever they needed in his way. Nowadays nearly all footwear is made at factories. When manufactories were first established the cutting was done at a central shop, and the work was given out to be done by the piece at the homes of operatives; but now everything is done in the workrooms of the central factory. Soles and uppers are cut by machinery. Whether the various parts are sewed together with thread, pegged with wooden pegs, riveted with metal rivets, or fastened with bits of twisted wire, the work is done by ingenious machines.

Development of the modern shoe factory began about 1815, with the adoption of wooden pegs instead of thread for fastening soles and uppers together in the cheaper grades of shoes. Shoemaking was then divided into three parts, namely, cutting, binding and bottoming. Then various machines were invented which facilitated and shortened all the operations. First came the rolling machine, by which the sole leather is thoroughly compressed in a minute, instead of the hour formerly required. Then the Howe sewing machine was adapted to sewing leather and used on shoe uppers, while steam power began to be applied to shoemaking machinery and increased production. But it was the Mc Kay sewing machine, capable of sewing uppers and soles together, that, in 1860, gave the greatest impetus to shoe production and established another industry typical of America. Other helpful inventions that followed included the Goodyear welt machine, the Reese buttonhole machine, Bigelow's and McKay's heeling machines, and the edge-trimming machine, all of which were in use by 1876, since which shoemaking machinery has been steadily improved.

In factory-made shoes the sole leather is first run through a skiving machine and pared to a uniform thickness. It then goes to a rolling machine, where it is rolled to greater solidity, and is then ready for the cutting out of the soles to the size and shape required. The cutting is done by means of dies operated by a steam hammer or by knives driven by machinery. Heels, uppers and linings are also cut to pattern by dies or machine knives, while the tips are cut by punching machines, with dies of many different sizes and patterns. The parts to be sewed are then sent to a stitching room, where the work is done by sewing machines operated by power, and the

methods of "quantity production" often allot a separate operator and machine to each seam. The process of bottoming comes next, in another department, where the uppers are placed over lasts, soled, and heeled. Heels are sometimes nailed together, lift by lift, by a nailing machine before being attached to the shoe; another method is to build up the heel on the shoe, then pare it off and curve it to the shape desired. The final trimming and polishing are functions of another department, where the work is done by revolving wheels, burnishers, and other machinery. The dull finish of calfskin is obtained by rubbing the shoe with grease, then with an ebony stick. When liquid polish is used, the shoe is finished with a hot iron. Different methods are employed for special kinds or makes of shoes, but in the main the manufacturing process follows the course stated.

Rubber boots and shoes, including overshoes with rubberized cloth tops, form an important branch of American shoe manufacture, though quite distinct from the manufacture of leather shoes. Raw rubber comes to the factories in crude lumps of various sizes, and after being ground and washed is rolled into sheets. A process of vulcanization follows, sulphur being added for this purpose, with coloring matter, etc., and the sheets are then rolled thin between hot rollers. Cloth backing is then applied by pressure machines, and the rubber shoes are cut from this material, different thicknesses being used for uppers, soles and heels. The parts are then put together over wooden lasts, edges joined by cement, varnished, and vulcanized.

The principal American shoe factories are located in Brockton, Lynn, Haverhill, North Adams and Boston, Mass.; New York, Cincinnati, St. Louis, Rochester, Philadelphia and Chicago. The product of these factories finds its way all over the world, in competition with the best products of Europe. In 1920 there were 1,449 shoemaking establishments in the United States, with 211,049 wage earners, a capital of $612,625,075, and a product for that year valued at $1,155,041,436; besides 679 establishments turning out boot and shoe cut stocks or boot and shoe "findings" worth over $225,000,000 for the year. Twenty-five large establishments were engaged in making rubber boots and shoes, with 32,875 workers and an annual product amounting to $116,917,434. The total products of the boot and shoe industry in the United States therefore approximated one and one-half million dollars in 1920. And while a pair of shoes in the making may require the operation of forty different machines and fifty or more workmen, the entire process can be completed, when necessary, in a few minutes. This is the most completely organized industry in America.

There are five principal types of leather shoes known to the trade; namely (1) the peg shoe, which is the least expensive and most common, its process of manufacture having been described above; (2) the standard screw shoe, stitched with screw wire, used in the soles of the heaviest boots; (3) the McKay sewed shoe, which is made after the style set by the leather-sewing machine inventor, Gordon McKay; (4) the "turn" shoe, an old-fashioned type; and (5) the "Goodyear welt" shoe, which is the best type of footwear recognized by the shoe trade. In the process of manufacture of the welt shoe, from the raw material to the finished product, it is said to pass through the hands of 106 different workmen and the operations of 58 different machines, thus marking the tremendous development that has overtaken the shoe industry since the days of shoemaking in the home, when the cobbler made his living by "sticking to his last" and had for his motto: "There's nothing like leather."

Borax, a white, salty crystal with a sweetish, alkaline taste. It is a compound of boron, sodium, and oxygen ($Na_2B_4O_7$). It forms like ice around the shores of certain waters. American borax is obtained from the waters and deposits of saline lakes in California and Nevada. Large shipments are made from the volcanic lakes of Bolivia. Borax occurs in the hot springs of Tuscany and in certain brackish lakes of Tartary, Tibet, Ceylon, and China. Borax is used in blowpipe analysis. A little borax powder sprinkled

in a joint facilitates welding and soldering. Theoretically a large dose of borax is poisonous, but no harm seems to come from its frequent use as a preservative. During the Spanish-American War, it may be remembered, an accusation was brought that meats furnished the troops were canned in borax. Borax ranks with alcohol and salt as a preventive of bacterial growth. It is a disinfectant. Borax water is used in washing the furniture, clothing, and bedding of the sickroom. Fresh borax water is used to rinse milk bottles, to freshen the teeth, and to spray a sore throat. Surgeons use boracic acid to sprinkle wounds. It is a milder antiseptic than listerine. Borax softens hard water and makes washing easier. About 40,000,000 pounds of borax are produced in the United States annually. See DEATH VALLEY.

Bordeaux, bôr-dō′, a city in the southwestern part of France. It is situated on the Gironde River, about seventy miles from the Bay of Biscay. It may be reached by ships of heavy draft. It lies on the bend of the river with three miles of quays for the accommodation of shipping. The river is crossed by one of the finest stone bridges in Europe. It rests on seventeen arches, and was finished in 1821 at a cost of $1,200,000. A number of public buildings, including a city hall, custom house, exchange, and a fine Gothic cathedral, are of interest. Bordeaux is far enough from Paris, and has had a large enough part in the history of France to have a large library, museum, botanic garden, observatory, and art gallery of its own. The city lies in the center of a productive region famous for its red wines known usually in the trade under the name of claret. Shipbuilding, weaving, and the making of pottery and soap are among the important industries. Bordeaux was at one time a possession of the English crown. It was the residence of Edward, the Black Prince, for a time. Montaigne, Montesquieu, and Rosa Bonheur were natives of the immediate vicinity. Statues have been raised in their honor. The modern city is a prosperous commercial emporium, engaged in commerce with the French colonies. The population given in 1921 was 267,409. In population Bordeaux is the fourth city of France; in importance as a port it ranks third. See FRANCE.

Bordeaux Mixture, a liquid much used for spraying plants. The name is due to the early use of the mixture by members of the Academy of Science at Bordeaux, France. It was found about 1880 that copper sulphate, or blue vitriol, had the virtue of killing mildew and other parasitic growths on grape-vines. The use of the mixture spread from the grape growers of France to Germany, Spain, Italy, England, and other countries, both of the Old World and the New, until Bordeaux mixture has come into general use among florists, fruit growers, and gardeners as a preventive of mildews, rusts, scabs, etc. Growers of peaches spray before the buds open to kill all spores. Potato growers spray their vines to keep the leaves from rusting. The mixture is a general remedy for the fungous plant pests that infest the garden and orchard, just as paris green is the foe of corresponding insect pests. Although the use of the mixture is recent, farmers' clubs and granges, as well as large growers of potatoes, now order blue vitriol by the car load. One writer recommends the following method of preparing the mixture: Blue vitriol dissolved in water, warm, even hot water is best, 6 pounds; slaked lime dissolved in water and strained, 3½ pounds; water, 50 gallons. Shake thoroughly. The mixture may be applied wastefully with a whisk broom or a watering pot, but the proper way is to use some sort of a syringe or force pump provided with a spraying nozzle. See SPRAYING; PARIS GREEN.

Borden, Robert Laird (1854-), premier of Canada. He was born at Grand Pré, Nova Scotia, and educated at Acacia Villa Academy, Horton. He studied law and was admitted to the bar in 1878. He soon came to have an extensive practice, and acquired considerable fame as a barrister. Elected to the Commons in 1896, he took a leading part in many important debates. Upon the retirement of Sir

Charles Tupper, he became the leader of the Conservative party. With a small but aggressive minority he waged an unequal contest for years against the Liberals under Sir Wilfred Laurier. In 1911, however, upon an appeal to the country by the Liberal government as a result of the controversy over reciprocity with the United States, Borden successfully led the Conservatives to a decisive victory; and in October, 1911, he was chosen premier. He resigned in 1920 because of ill health.

Bore. See TIDE.

Boreas, the north wind. Boreas was reputed to dwell in Thrace from whence his winds reached Greece. A temple was erected in his honor at Athens to commemorate his destruction of the fleet of Xerxes. In art he was represented with wings. His hair and beard were full of flakes of snow. As he flew, his trailing garments stirred up clouds of dust.

Borgia, bor′jä, in Italian history, a famous family of the fifteenth century. The most noted members of the family were Pope Alexander VI, the same who reluctantly suppressed Savonarola, and two younger members, brother and sister, known as Cesare and Lucretia Borgia. Pope Alexander brought scandal on the holy office. He died, it is suspected, of poison. His remains were treated with disrespect. In their lust for power the younger people left a long trail of assassinations by stabbing, and particularly, by poisoning. Cesare became a cardinal and a duke. He aimed to build up an independent kingdom in central Italy. It is not possible at this date to separate fact from calumny, but it is evident that the Borgias were able and ambitious, and that they scrupled at nothing. The family record is such that the name of Borgia is synonymous for utter depravity. The Borgias, like the Medici, were patrons of art. Cesare is the typical statesman held in mind by Machiavelli in his noted work on practical politics. See MACHIAVELLI.

Boring, a method of drilling holes. In mining and in prospecting for oil three methods are employed. The simplest method is that of attaching various steel drilling instruments to the end of a cord and letting them fall by their own weight. This method has been long in use among the Chinese. In the second method the rope is replaced by a sectional rod which is raised from the hole whenever it is necessary to exchange a chisel for a scoop with which to remove the dust. The modern instrument, with which engineers bore holes from an inch and one-half to several inches in diameter, is the diamond drill. Pointed pieces of black diamond, harder than any other rock or metal, are set around one end of a steel tube. As this tube is rotated swiftly the diamonds cut an annular hole through the rock, permitting the tube to descend around a core. Water forced through the tube clears the cutting edge from dust and carries it up outside of the tube. As the instrument advances, the cylinder is lengthened by screwing on sections of iron tubing of the same diameter. The core is broken off and removed from time to time. In this way borings are made not infrequently to a depth of half a mile. Prospectors bore holes with diamond drills to ascertain whether a body of ore is worth working. Diamond drills, driven by small engines or electrical motors, are used extensively by miners and quarrymen in making ready for blasting. The superintendent or foreman of a mine not infrequently carries $20,000 worth of diamond points with which to replace those that have become dull. See BLASTING.

Borneo, a large island southeast of Asia. It forms the southeast boundary of the China Sea, and lies neighbor to Java and Sumatra. If Australia be reckoned a continent, Borneo is the second island of the world in size. Its estimated area is 293,500 square miles, or three times that of the West Indies. The interior is mountainous, the highest peaks varying from 11,000 to 15,000 feet in height, quite equal to those of the Alps.

The coast is about 3,000 miles in extent, and varies from mountain spurs that reach the sea to morasses of great extent. For boats of twelve-feet draft a score of rivers are navigable for 100 or 200 miles into the interior. It is thought that Borneo

is an extension of the Malay Peninsula, and that the connecting land has sunk beneath the sea, just as the land formerly connecting England and France has sunk. The animals and plants of the island are like those of southeastern Asia. The forests yield teak, ebony, gutta-percha, sago, resins, oils, and gums. Nutmegs, cloves, pepper, cinnamon, ginger, rice, millet, cotton, indigo, sugar-cane, tobacco, coffee, sweet potatoes, yams, pineapples, cocoanuts, camphor, and betel nuts are among the productions.

Collectors find Borneo rich in brilliant butterflies and moths. The swamps and waterways swarm with tortoises, lizards, frogs, and crocodiles. Fishes are abundant. Pigeons, parrots, pheasants, peacocks, ptarmigans, vultures, and eagles are found along the streams. The swift that builds the edible nest so prized in China is found here. The elephant, rhinoceros, Malay bear, monkey, tapir, wild boar, wild ox, deer, tiger, and orang-utan are found in the jungles.

The mineral wealth of the island has not been developed fully. Coal, gold, copper, iron, tin, nickel, petroleum, sulphur, diamonds and other gems, and other mineral products have been found in considerable quantities.

The interior portions of the country are inhabited by people known as Dyaks. They constitute the bulk of the people. They are heathen and live a savage life. The next element is Malay. The Malays are Mohammedans. They live near the coast and till the soil. Their women are expert in the weaving of handsome mats and in making cotton fabrics and baskets of beautiful design. The third element is Chinese who have settled in the country, chiefly for purposes of trade. In addition there are a few Europeans.

Like Africa, Borneo has been parceled out by various foreign countries. The greater part of the island is held as a part of the Dutch East Indies. The British hold a tract in the north exceeding their own island in extent. Agriculture in the ordinary sense of the word has made little progress. The principal exports are therefore natural products, such as fruits, gold, coal, rattan, camphor, diamonds, gutta-percha, timber, dyewoods, and edible birds' nests.

British North Borneo, as the British portion of the island is known, has an area of 31,106 square miles, and a population of about 208,200, chiefly Mohammedans on the coast, and natives in the interior. The territory is confided to the British North Borneo Company somewhat after the plan of the East India Company. The directors sit in London. Their acts are subject to revision by the British secretary of state. The direct management of affairs is intrusted to a resident governor. The core of the territory controlled by the company is a Malay kingdom governed by a nominal Mohammedan sultan. As a means of conciliating this element of the population he is paid a salary of $12,000 a year. The company maintains a number of trading posts. Brunei, the residence of the governor, is built out on piles into Brunei Bay. A railway 120 miles in length runs from Brunei to another point on the coast. A cable connects the island with the mainland and telephone lines connect the trading stations. Jungle produce is bought from the natives, much as similar trade is carried on in sections inhabited by American Indians. Agriculture has made little progress. A score or more plantations are engaged in raising tobacco, tapioca, sago, rubber, cocoanuts, and coffee. There are missions, both Protestant and Catholic.

The Borneo Company mints copper, silver, and nickel coins, having the same names and values as American money. Paper money in denominations of one, five, ten, and twenty-five dollar bills, is issued. A limit of $400,000 is set by the British government. Accounts are kept in cents, dimes, and dollars. Trade is carried on chiefly through Hong Kong and Singapore. Connection is made at the latter port with ocean liners for London.

Dutch Borneo, on the west and south coasts, is larger, but is less known. The Dutch protect over 200,000 square miles of territory, inhabited by tribes thought to number 1,200,000 persons. Trade is maintained with the natives by means of

trading posts. Batavia, on the island of Java, is Dutch headquarters.

Boron, one of the chemical, non-metallic elements. Boron is not found free in nature. It is found only in combination with other elements, as in borax or in boracic acid. Boron has an affinity for sodium. It was discovered in 1808. Prepared boron is a greenish-brown powder without taste or odor, but producing a stain on the fingers. Boron crystals are made by heating a boric compound with aluminum. The crystals thus formed are known as boron diamonds. These are transparent; they scratch glass, corundum, and the sapphire; and for brilliance and beauty they cannot be distinguished by ordinary means from carbon diamonds. See BORAX.

Bosnia, bos'nia, until the Great War, a province in the Balkan peninsula west of Servia, now included in Jugo-Slavia. For five centuries Bosnia was subject to European Turkey. In 1878, by the Treaty of Berlin, this province, with Herzegovina and Novi-bazar, was placed under the control of Austria and thirty years later was annexed formally to Austria-Hungary. Bosnia has an area of 2,000 square miles. It is mountainous in the south, level in the north, where its beautiful valleys are dotted with forests and traversed by rivers. The agricultural products include hemp, tobacco, corn, wheat, barley, and rye. Fruit is abundant. Sheep, swine and goats are raised to quite an extent. There are coal and iron mines, and the manufactures include linens and woolens, iron goods, and leather. The population numbers about one and one-half million. The people are of Slavonic origin, and of various faiths. Jews and Mohammedans are numerous, while others are of the Roman Catholic and the Greek Churches.

Bosporus, bŏs'pō-rŭs, the strait that joins the Black Sea with the Sea of Marmora. It forms part of the boundary between Asia and Europe. The name is Greek for ox-ford. It is about eighteen miles long and 3,000 feet wide. A surface current flows outward from the Black Sea; an under current flows inward toward the Black Sea. The shores are high and picturesque. This is the strait that Darius crossed on a bridge of boats in his expedition against the Scythians. By treaty at the close of the Crimean War, it was agreed by the European powers that no battleships should be permitted to pass through the Bosporus without the consent of Turkey. This measure was taken to prevent the Russians from gaining access to the Mediterranean. The shores of the Bosporus are defended by a series of Turkish forts. The Bosporus abounds in fish. Its waters have been fished for thousands of years with nets and lines, but the fish seem as numerous as ever. Following the center of the channel, the water is from 148 to 388 feet deep. About once a century the surface is frozen over. See CONSTANTINOPLE.

Bossuet, bō-swā' (1627-1704), a noted French divine. He was born at Dijon. He was educated for the priesthood in his native town and in Paris. He was noted as a classical scholar, a refuter of Protestant doctrines, a pulpit orator, and as a writer on historical and other subjects. Bossuet was in the midst of the Huguenot controversy. He was chosen to convert the Protestants of Metz. In 1670 he became tutor of the young dauphin, with whose grandmother, Anne of Austria, he was a favorite. Both Louis XIV and his minister Mazarin regarded Bossuet with a kindly eye. He was elevated to various offices of importance in church and state. He is known best perhaps as Bishop of Meaux (mō). Here he officiated in a fine old cathedral but twenty-seven miles from Paris. Among his pulpit orations those delivered on the occasion of Marshal Turenne's admission to the Catholic church, on the death of the Duchess of Orleans, and at the tomb of "The Great Condé," are his most noted efforts. Bossuet's character is not called in question. He was a man of simplicity, piety, sincerity, and ability. His works fill forty-three volumes. He was one of the noted members of the French Academy.

Boston, the capital of Massachusetts and metropolis of New England. It is situated on a peninsula formed by the Charles River and an arm of Massachu-

setts Bay. The area of the original peninsula has been more than doubled by filling in Back Bay and by encroaching elsewhere upon the water front. The first settlement was effected in 1630 by a colony of several hundred well-to-do Puritans under the personal direction of Governor John Winthrop. They named their new home after their old town of Boston on the coast of Lincolnshire, England. The name is a corruption of St. Botolph's town. The English Boston still has its parish church of St. Botolph's, with Gothic spire, chime of bells, and lighthouse tower.

The settlers of Boston were the strongest body of colonists to settle in the New World. They had education and means. They left England to establish a church to their own liking, and were, from the first, leaders in colonial affairs. The government of the town was managed like a country township, through the town meeting, up till 1822. In case of an emergency the leaders convoked, not a meeting of the council, but a town meeting. This explains the activity and influence of Sam Adams and the number of orderly uprisings like the Boston Tea Party.

Boston has always been a commercial city. Sloops went up and down the coast gathering furs and other colonial products. Ships made regular voyages to the mother country. John Hancock, perhaps the most influential man in the colony, was a wealthy merchant. The English government could devise no severer punishment for the rebellious city than the Boston Port Bill of 1774, forbidding ships to enter Boston Harbor. Boston is still the second maritime city of the Union in point of commercial activity. It is the principal wool market, and handles more leather, hides, shoes, and fish than any other city in the Union. Enough shoes are made in the vicinity of Boston to supply every man, woman, and child in North America and the West Indies with a new pair yearly. The census of 1920 gave the city a population of 748,060, or seventh in the United States. If suburbs be counted, the rank of Boston is fourth, or if a radius of fifty miles be used, it is second only to New York.

The affairs of the city have been well managed on the whole. A fine park system, a public library, one of the best water supply systems in the world, sanitation, street railways, and lighting have been managed without the outrageous scandals that have fallen on other American cities.

The proximity of Harvard University, the presence of other institutions of learning, an excellent system of public schools, the activities of noted publishers, the residence of by far the lion's share of the names noted in American literature, notably Longfellow, Holmes, and Lowell, the publication of the *Atlantic Monthly,* and a leading place in the affairs of Congregationalism and Unitarianism have given Boston a decided reputation for intellectuality. Its being the intellectual, commercial, and political center of a large section led Oliver Wendell Holmes, in a spirit of facetiousness, to dub Boston "the hub of the universe."

General Plan. The city occupies an irregular site of 47.3 square miles. In the northern or older part of the city the streets are narrow and winding, but in the new parts they are broad and straight. The wholesale section is along and near the water front. Washington and Tremont are the two principal streets in the retail section. State Street, in the midst of the retail district, is the financial center. The Back Bay district is the most exclusive residence section.

Parks and Boulevards. Boston Common, in the heart of the city, is the oldest park in America. It contains only 53 acres, but because of its historical associations it is the most interesting park in the city. The Soldiers' and Sailors' Monument, the Shaw Memorial and the monument to the sailors who perished in the Boston Massacre, are its most interesting monuments. The Public Gardens adjoin the common on the west. Here is the colossal equestrian statue of Washington. Commonwealth Avenue, extending from the Public Gardens into the Back Bay

district, is the most beautiful boulevard in the city.

The park system consists of an inner and outer park circle, all connected by boulevards. The inner circle, consisting of about 2,300 acres, has Franklin Park for its center. The outer circle within a radius of 10 or 12 miles comprises 10,000 acres, including Middlesex Fells and the Blue Hill Reservation.

Places of Historic Interest. A few historic structures have been preserved. Perhaps the most important of them is the Old Statehouse on Washington Street, at the head of State. The first structure, completed in 1659, was practically the town and colony house. The present building completed in 1750 is the third upon the same site. It was the home of the General Court, and within it during the stormy years proceeding the Revolution, numerous measures leading to American indeepndence were taken.

The Old South Meeting-House or the Old South, at the corner of Washington and Milk Streets, occupies the site of the former home of Governor Winthrop. The present building dates from 1729 and preserves the type of the Puritan meeting house of colonial days. It was the great meeting place of the people and was known as the "Santuary of Freedom." King's Chapel, on Tremont Street, completed in 1754, was attended by the royal governors during the provincial period. In the churchyard are the graves of the Winthrop family, John Cotton and others prominent in colonial history. Christ Church on Salem Street is the Old North Church from whose belfry tower were hung the lanterns that guided Paul Revere in his midnight ride. See Revere, Paul.

Burying Grounds. The burying ground adjoining Kings' Chapel is the oldest in the city. That on Copp's Hill is the second oldest. In it are found the graves of Samuel and Cotton Mather and many others prominent in the Revolutionary struggle. The old Granary Burying Ground on Tremont Street, between Park and Beacon, contains the remains of Paul Revere, the Hancock family and Samuel Adams.

Public Buildings. The State House on Beacon Hill is the most important public building. It was completed in 1789 and enlarged in 1890. The architecture is colonial and the edifice is of yellow brick with white marble trimmings. The gilded dome can be seen from a long distance. The Federal Building, the Custom House, the City Hall, the Boston Atheneum and the great North and South railway stations are all magnificent structures.

The public Library at Copley Square is one of the most beautiful buildings in the country. The crouching lions by Saint Gaudens, at the foot of the Grand Stairway, the Mural paintings by Puvis de Chayannes, the scenes from the Holy Grail by Abbott and the Freize of the Prophets by Sargent, attract thousands of visitors. The library has one of the largest circulations in the world. Nearby are Trinity Church, the New Old South Church, the Roman Catholic Cathedral, the First Church of Christ, (Scientist) and the First Spiritual Temple (Spiritualists)—all prominent church edifices. In the Fenway region are found the Opera House, the new Art Meseum, Simmons College, Harvard University Medical School, the Boston Normal School and the Conservatory of Music. See Adams; Fanueil Hall; Massachusetts.

Education. Harvard University, although it is across the river in Cambridge, is the leading educational institution of the city. Other institutions for higher education include Boston University, Massachusetts Institute of Technology ("Boston Tech"), Simmons College (for women). The Perkins Institute for the blind is the best school of its kind in America. The Boston Latin School and the English High School occupy the largest school edifices in the United States. The New England Conservatory of Music, the Normal Art School and the Lowell School of Design each have a national reputation for the high standards they maintain.

Boston Massacre, a name given to a disturbance which occurred in Boston, March 5, 1770. The trouble arose from the fact that the citizens of Boston objected to the stationing of British soldiers, in

Faneuil Hall

Bunker Hill Monument

HISTORIC STRUCTURES IN BOSTON

the city in time of peace. Seven British soldiers and a mob of Boston citizens were engaged in the affray, three of the latter being killed and seven wounded. The soldiers were tried for murder, but were acquitted.

Boston Tea Party, in American history, the violent destruction of three cargoes of tea in Boston Harbor December 16, 1773. The entire history of the Boston Tea Party is a long one. The East India Tea Company, a London corporation, desired to supply the American colonies with tea. According to British law this company had the sole right to do so, but, owing to an English tax varying from six to twelve cents a pound, the Americans were able to buy smuggled tea from Dutch shippers at a lower price. In 1773 there were 17,000,000 pounds of unsold tea in the London warehouses of the East India Company. There was danger of failure, financial panic, and political disaster. To avoid a financial disaster the British government came to the help of the straitened tea company with a drawback, an agreement to refund a sum that would enable the British tea owner to undersell the Dutch despite the American duty. This was not satisfactory to the colonists. The point of contention was not the cost of tea, but the principle of requiring the payment of any duty at all to the mother country. England, the colonists held, should not be permitted to collect money from merchants in American ports. Cargoes of tea were sent promptly to American ports. Ships reaching New York and Philadelphia were sent back with their tea unloaded. At Charleston the tea was held until it spoiled in the chests. Four tea ships appeared in Boston Harbor. The British government insisted that they be permitted to land the tea. The American patriots, as they called themselves, were equally determined that no merchant should receive the tea. British men-of-war guarded the mouth of the harbor to prevent the departure of the merchant ships.

On the evening of December sixteenth, so the account runs, an audience of 7,000 people gathered in and around the Old South Meeting House to listen to Sam Adams and other determined speakers. Finally Samuel Adams, according to a preconcerted arrangement, closed his remarks with the appointed signal, "This meeting can do nothing more to save the country." Forty white men, disguised in the garb of Mohawk Indians, had made ready in an old printing office near by. On receiving the word, they at once raised a war whoop and rushed for the wharf, followed by several hundred citizens. They boarded three ships, chopped open the tea chests with hatchets, and threw the tea into the harbor. Three cargoes, in all 342 chests, containing about $90,000 worth of tea, were destroyed. The tea floated up and down the harbor until it sank or blew ashore. The fourth ship with its cargo was wrecked near Cape Cod. The attempt to land tea was accordingly frustrated.

An eyewitness, whose account has been preserved in the *Massachusetts Historical Society Proceedings,* says gravely: "They say the actors were Indians from Narragansett. Whether they were or not, to a transient observer they appeared as such being cloath'd in blankets with the heads muffled, and copper-colored countenances."

The famous Boston Tea Party was orderly, even though it was a boisterous, energetic affair. It may be termed rebellious, or revolutionary, but it was not a riot. There was no savor of mob-rule. The "Mohawks" represented the deliberate purpose of the colonists.

Samuel Adams rose and exclaimed, "This meeting can do nothing more to save the country!" In an instant there was a shout on the porch; there was a war-whoop in response, and forty or fifty of the men disguised as Indians rushed out of the doors, down Milk Street towards Griffin's (afterward Liverpool) Wharf, where the vessel lay. The meeting was declared dissolved, and the throng followed their leaders, forming a determined guard around the wharf. The "Mohawks" entered the vessel; there was tugging at the ropes; there was breaking of light boxes; there was pouring of precious tea in the waters of the harbor. For two or three hours the work went on, and three hundred and forty-two chests were emptied. Then, under the light of the moon, the Indians marched to the

sound of fife and drum to their homes, and the vast throng melted away, until not a man remained to tell of the deed. The committee of correspondence held a meeting next day, and Samuel Adams and four others were appointed to prepare an account of the affair to be posted to other places. Paul Revere who is said to have been one of the "Mohawks," was sent express to Philadelphia with the news, which was received at that place on the twenty-sixth. It was announced by ringing of bells, and there was every sign of joy. . . . The continent was universally stirred at last.—A. Gilman, *The Story of Boston.*

Boswell, James (1740-1795), a Scottish writer. His father was a judge and gave him a liberal education. The young man had a fondness for literature, but showed no marked ability in any direction. During a visit to London he formed the acquaintance of Dr. Samuel Johnson, at whose feet he literally sat during the rest of that famous man's life. He became a member of the noted literary club of which Dr. Johnson was the center. In 1773 he induced Johnson to visit him in Scotland, and together they made a tour of the Hebrides off the coast of Scotland. In 1791 appeared his *Life of Johnson,* the most famous biography in the English language. It goes into the details of a great man's life as none but a Boswell could have gone. Boswell's character is not attractive. He was a hanger-on, he heard every word, saw every act, and he could not be snubbed. It must be confessed, however; that he had the greatest veneration for Dr. Johnson, and that to a prodigious memory he united an untiring industry as a note taker and no little skill in delineation. The *Life* is drawn out to extreme length—one edition occupies ten volumes, but no one would wish it cut down.

Boston University, a coeducational institution founded in Boston in 1869 by the Methodist Episcopal Church. It has college and graduate departments, including schools of law, medicine, science and theology, and provides post-graduate work in history, language, philosophy and science. The agricultural college is affiliated with the Massachusetts Agricultural College at Amherst. The faculty numbers about 360 and the enrollment exceeds 9,800.

Botanical Garden, a term applied to grounds set apart for the express cultivation of plants from various parts of the world. It is impossible, of course, to establish in any one garden conditions under which all plants, from rainy regions to rainless deserts, and from the Arctic Circle to the tropics, will grow and flourish; but by the assistance of hothouses for tropical vegetation it has been found practicable to rear as many as 12,000 to 15,000 species in a garden situated in a temperate climate. Botanical gardens usually include as many different kinds of soil, as sand, gravel, loam, muck, with as many different kinds of exposure from northern shade to southern slope, as it is possible to secure. Steam heat and glass roofs have made it possible to imitate a tropical climate the year around. Pools for aquatic plants may be either hot or cold, adding greatly to the variety of plants possible. A botanic garden may be made to serve an important educational purpose, by showing the dependence of different kinds of plants on particluar sets of conditions. Some plants grow only on a limestone rock; others only in mud at the bottom of a pool; others must have no water at all. Groups of plants may also be made according to their value for medicine or food or clothing, and again as to whether they yield starch or oil or resin.

There are many fine collections of plants in the United States, probably the oldest being the Missouri Botanical Gardens, at Saint Louis. The New York Botanical Garden, which occupies 250 acres in Bronx Park, New York City, has the finest greenhouses in the United States. The botanical gardens of Cambridge, Mass., and the Arnold Arboretum at Brookline, in connection with Harvard University, are very fine collections. The botanical gardens in parks are called conservatories, and among these there are some choice collections, the one at Garfield Park, Chicago, being particularly artistic.

The elder Pliny describes a garden at Rome about 70 A.D. in which a number of medicinal plants were grown. In fact, the earlier botanical gardens appear to

have been devoted to medicinal herbs. The old monastery at St. Gall, Switzerland, had a garden as early as 1020, chiefly of medicinal species.

The Jardin des Plantes, in Paris, France, is one of the oldest and largest gardens known, having over 15,000 varieties. The gardens at Edinburgh, Oxford and Kew are remarkable for their collections, the last named being world-famed. Other famous gardens in Europe are those of Upsala, Bologna, Leyden, Strassburg, Munich, Göttingen and Leipzig. See KEW; SHAW'S GARDEN; BARTRAM.

Botany, the science of plants. The history of botany among the ancients begins with Aristotle and Pliny. A Greek physician named Dioscorides left a record of the medicinal value of many plants. The chief botanical interest in the Middle Ages lay in the study of plants as remedies. The early collections were made, and the first botanic gardens were established, in the interest of medical science. Physicians led the way in the study of new plants. The next phase of botanical research was the arrangement of plants in groups. In the eighteenth century Tournefort, Linnaeus, and Jussieu worked out the classification of plants. A group of workers connected with Kew Garden, notably Banks, Lindley, and Bentham had unsurpassed facilities for collecting and receiving material from all parts of the vast British Empire. In North America Nuttall, Torrey, Gray, Engleman, and Vasey were privileged beyond their associates in facilities for receiving, classifying, and naming new plants.

As the result of two centuries of diligent, systematic work, the greater part of the plants of the world have been named or at least grouped as follows:

Slime molds	500
Bacteria, algae, fungi, and lichens,	60,000
Mosses and liverworts	8,000
Ferns and their allies	3,500
Flowering plants	120,000
Total	192,000

Now that systematic botany is so well under way, other departments are receiving more attention. Of late the life of the lower forms, especially bacteria, has been a subject of intense investigation. After comparative silence for half a century medical science has reappeared in the botanical field and has shown that plant life is connected with many contagious diseases. Plant physiology and economic botany, or the study of plants useful in the arts, are well recognized departments.

It was quite possible for a Linnaeus to know practically all that was known on the subject in his day, but knowledge has extended so rapidly and botany has been subdivided into so many branches, that it is now possible for a scholar to master only a small part of the present science in a life time.

Within the past century the science of botany has received much attention and eminent botanists have recognized several divisions, each of which might be considered a science by itself. They are, however, usually treated as divisions of the main science. In their logical order of study they are morphology, anatomy, physiology, ecology and taxonomy or classification.

MORPHOLOGY treats of the structures and their development. It includes the study of the life history of a plant from the single cell in which it has its beginning to maturity. The chief purpose of this study is to discover through the development of structures the relations which the plant under investigation bears to other plants and the relation of these groups to each other. Morphology lays the foundation for classification and is an important division of botany.

ANATOMY treats of the structure of plants. It begins with the study of the cell, discovering and describing the arrangement of cells in the various tissues as in the wood, the bark and leaves of a tree. The study of the different forms and structure of cells is frequently termed histology. This is one of the recent branches of botanical science because it was not possible before the perfection of the microscope. Anatomy is closely associated with morphology and physiology.

PHYSIOLOGY. The study of the functions

of the different organs of plants began in the latter half of the seventeenth century, long after a knowledge of human physiology had been acquired. In the course of time the study of plant physiology led to the interesting discovery that the life processes of plants and animals are similar. Plant physiology includes the study of all the vital processes of the plant—absorption of nourishment from the soil and air, circulation of the sap, transpiration, changes which the sap undergoes in the leaf, development of the reproductive organs and their functions, and the plant's method of scattering its seeds. This study is of unusual interest.

Ecology. This division treats of the mutual relations between plants and their environment. This phase of botanical study has been considered as a separate branch since 1895. It includes study of the reactions of plants and their organs to their environment, as the effect upon the plant of a change of soil and of climatic conditions; the origin and development and life relations of plant communities known as plant societies, and a study upon a large scale of the forest, grass and desert regions. This is often termed geographic ecology.

Classification of Taxonomy. Plants are scientifically arranged in groups according to their relations. A group of plants of the same kind, as sugar maples, form a species, groups of species closely related form a genus (plural genera) or a family—as the maple family, which includes the sugar maple, the red maple, etc. Families are grouped into orders, orders into classes, and all classes are combined into four great groups which constitute the vegetable kingdom. Beginning with the individual plant we have:

Species
Genera
Family
Order
Class
Great Groups
Plant Kingdom

Scientific names are given in Latin and the same plant has the same scientific name throughout the world. Each plant has two names, the generic or family and the specific name. The generic name is given first and followed by the specific, as acer saccharum, which when reversed and translated means sugar maple.

The four great groups are:

1. *Thallophytes* which include the simplest forms of vegetation-bacteria, algae, fungi, etc. Some of these are merely one celled organisms, and are without roots, stems, leaves or flowers. Each is described under its title.

2. *Bryophytes* which include mosses and liverworts.

3. *Pteridophytes* or fern plants. In this group we find ferns, horsetails or scouring rushes and club mosses.

4. *Spermatophytes* or seed plants. To this group belong the most conspicuous, beautiful and useful plants. The spermatophytes are divided into two classes:

1. Gymnosperms or naked seeded plants, such as the trees of the pine family and the cycads.

2. Angiosperms or plants with covered seeds. The Angiosperms are divided into two subclasses:

(a) Monocotyledinous plants which include the Grass Family, the Lily Family, the Palm Family, the Orchid Family, the Amaryllis Family, the Iris Family, the Banana Family and the Pineapple Family.

(b) Dicotyledenous plants which include over 200 families, many of them of our most common plants, such as the elm, the maple, the buttercup, the rose and the mustard.

Distribution of Plants. Plants are everywhere. Those under cultivation constitute only a small number among the thousands of species on the earth. The number and character of plants in any locality depend upon: (1) climate, including temperature and moisture; (2) elevation above the sea; (3) nature of the soil, and (4) the direction of the prevailing winds. The most luxuriant vegetation occurs in the tropical regions that have abundance of moisture. The arid regions of the temperate and tropical zones are barren from lack of moisture.

In the interior of the polar regions plants are seldom found, but they survive on the borders of these inhospitable climes.

Water is teeming with thousands of plants; they are found in the running stream, the stagnant pool and in the sea. Each species is adapted to its habitat and thrives where other species cannot live. The plants most useful to man are nearly all natives of the temperate zone.

Practical Botany. Man is dependent upon plants for food, fuel, clothing and shelter. From this viewpoint botany becomes an intensely practical science. The most expert botanists are connected with agricultural colleges and experiment stations, where they are engaged in improving strains of wheat, corn and other plants, and in developing new varieties. The ultimate ends of these efforts are to increase production and improve the quality of the crops.

Plant Breeding. The main purposes of plant breeding are to secure a larger yield; to improve the quality of the plant; to adapt the plant to climatic conditions; to secure increased resistance to disease, and in some instances, to secure resistance to drought.

Two methods are followed—cross fertilization and selection. Cross fertilization consists in fertilizing the ovules of one plant with the pollen of another. Plants grown from seeds produced by cross fertilization usually partake of the qualities of both parents. One of the best illustrations is the loganberry which was produced by crossing a wild California blackberry and the Old Red Antwerp raspberry. Closely allied plants such as the raspberry and blackberry can be used successfully in cross fertilization but the range for choice is limited to species in the same genus. The apple and the cherry for instance, although belonging to the same family cannot be crossed to form a new variety of fruit.

The method of selection is similar to that employed in the selection of seed. The strongest and most prolific plants are selected and the seed is planted in a plot away from other fields of the same crop. Before the plants have fully matured all but the best are destroyed. The second and succeeding seasons the same process is repeated until a variety is obtained that will reproduce itself through successive seasons without deterioration.

The time required to develop and place on the market a new variety of any plant, as wheat or corn, depends upon numerous conditions, and cannot be definitely stated, but in all cases it extends through several seasons and sometimes ten or even fifteen years may be required to carry the experiment to success.

Botany Bay, a border water on the southeastern coast of New South Wales, Australia. It received its name in 1770 from Sir Joseph Banks, the botanist of Captain Cook's voyage of discovery, who collected a large number of new plants here. At this time Captain Cook took possession in the name of England. In 1788, the American colonies having asserted their independence, and being no longer available as a place of banishment for convicts, the British government founded a penal colony on Port Jackson, where Sydney now stands. It was the British policy for many years to banish thieves, forgers, housebreakers, rioters, and other troublesome characters to this colony, instead of imprisoning them. In some way the colony acquired the popular name of "Botany Bay," but, as a matter of fact, the convict establishment was on the other side of a peninsula some ten miles from Botany Bay. The custom was discontinued in 1840, because of the protest from the settlers, who by that time had become numerous and influential. See Australia.

Botfly, a family of parasitic flies. The horse botfly has the appearance of a honey bee with a lengthened abdomen pointed forward under the body. This botfly hovers about the legs of horses, attaching its eggs to the tip of hairs, where they can be reached readily by the horse who licks them off as they hatch and swallows them. The maggots hook themselves to the inner coat of the beast's stomach, and remain until full grown, when they pass out with the dung, and hide in the earth until the change or metamorphosis is complete. The maggots of a botfly that annoys the ox lodge in the

throat in a similar way, and are found later burrowing under the skin of the back, but it is not understood as yet how they get there. A sheep botfly lays its eggs in the nostrils of the sheep. The maggots live in the forehead and horns, often giving the sheep the "staggers." When full grown the maggots pass out through the nostrils into the earth. The grubs of other botflies infest rabbits, deer, squirrels, and reindeer. See FLY; INSECTS.

Botha, Louis (1864-1919), a Boer commander, born in Greytown, Natal. In early life he was a farmer, and as a young man had a share in the formation of the Transvaal Republic. He fought in the Kaffir campaign, and later was elected to the Volksraad at Pretoria. When the Boer war with England began in 1899, Botha was given a subordinate command, and upon the death of General Joubert, in 1900, he was given command of the Boer army. He won great victories at Spion Kop and Colenso, and became the first Premier of the South African Union in 1910.

At the outbreak of the World War, Botha commanded an expedition invading the German colony in Southwest Africa, and made a complete conquest of that region. He then organized a force to help the British invasion in German East Africa. General Botha was one of the South African representatives at the Peace Conference in Paris.

He died suddenly on August 28, 1919.

Bothwell, James (1536-1578), a Scottish earl, known in history as the third husband of Queen Mary. By various intrigues he obtained high office near the person of Queen Mary with whom he became a great favorite. In 1567 Darnley, her husband, was blown up in a hunting lodge, as was believed with the connivance of Bothwell. At all events the latter conducted the queen to Dunbar Castle soon afterward, and married her. The Scottish nobility, however, resented his rise to power, and rescued the queen, as they pleased to term it, from his influence. He fled to the Orkneys, thence to Norway and to Denmark where he died insane. See MARY, QUEEN OF SCOTS.

Botticelli, bŏt-tē-chĕl′lē, **Alessandro Filipepi** (1447-1510), an Italian painter. He was born at Florence, the son of a tanner named Mariano Filipepi. The name of Botticelli was given him from the fact that he was put to work with the goldsmith Botticelli, when he failed to make sufficient progress in school to satisfy his father. Later the young man studied with Fra Filippo Lippi, a celebrated artist. Botticelli's paintings are preserved in European galleries, as well as in frescoes in the Sistine Chapel at Rome. Among his great pictures are *Triumph of Spring, Birth of Venus, The Coronation of the Virgin, The Nativity, The Adoration of the Magi.* The faces of all Botticelli's figures are noticeable for delicacy and beauty of expression. His madonnas are his most famous works, and have an individuality about them which has made them favorites with all lovers of beautiful pictured faces.

Bottle, a stone or glass receptacle for liquids. The ordinary bottle is made of molten glass which the glass maker blows into a mold. Bottles are of all shapes and sizes, from delicate vials no larger than the tip of a penholder to the magnum in which port wine is sent to market and the ten gallon carboy in which acids are transported. A bottle is presumed, however, to have a narrow neck and a mouth closed with a cork, rubber, or glass stopper. By a figure of speech a fleet is said to be bottled up when it is shut up in a harbor with a narrow entrance occupied by a superior force.

Glass bottles may not only be sealed readily so as to exclude air, but they are especially valuable from the fact that almost all substances may be kept in glass without dissolving and corroding the bottle in which they are kept. Wine may be kept in a glass bottle for hundreds of years without acquiring a taste such as would be imparted in time by a wooden or metal cask. In addition to the demand for domestic purposes and for the druggist American bottlers of wine, beer, whiskey, and mineral and aerated waters use $4,000,000 worth of bottles annually.

The bottle of the Scriptures, still used

by the water carrier of the East, is made of leather, particularly the skin of a goat. In making, the skin is stripped off as nearly whole as possible. It is tanned and sewed up all but one leg, which serves as a neck. This is the waterbag still used by the caravan. "Men do not put new wine into old bottles," because new wine is likely to ferment and burst a sheepskin weakened by long service.

See GLASS.

Bottom, in Shakespeare's *A Midsummer Night's Dream,* an Athenian weaver who plays the part of Pyramus in the interlude of Pyramus and Thisbe. Oberon, the fairy king, punishes his queen Titania by directing Puck to anoint her eyelids with "love-in-idleness." The result of this treatment is that Titania falls in love with and caresses Bottom, upon whom Puck has fixed the head of an ass. Bottom is a brawny, awkward fellow, ignorant, but full of conceit and mock heroism. See MIDSUMMER NIGHT'S DREAM.

Boucicault, bōō-sē-kō′, **Dion** (1822-1890), an Irish dramatist and actor. He was born at Dublin, and received his education at London. His first play, *London Assurance,* was brought out when he was only nineteen years of age. Its immediate success decided him to devote his life to the stage. He came to the United States in 1853, where he was well received. His greatest success was in *Colleen Bawn.* Other favorites are *Arrah-na-Pogue, The Octoroon,* and a dramatization of *Foul Play,* Charles Reade's novel. The dramatization of Irving's *Rip Van Winkle* was produced by Boucicault in collaboration with Joseph Jefferson. Boucicault was a pleasing but not a great actor.

Boulder, a loose, waterworn, or rounded rock lying on the surface or imbedded in clay and other soils. The name is given to loose rocks lying in water courses, but especially to the rounded blocks of granite and other durable stone found in the paths of former glaciers. The theory is that they were torn from ledges of rock by streams of ice and were transported sometimes for thousands of miles. They vary greatly in size from mere pebbles to huge specimens fifteen feet in diameter.

Boulevard, bōō′lē-värd, a broad street or drive, presumably lined with trees. The term is French, corresponding to the English bulwark, a defensive wall or rampart. As the need and indeed the utility of walls passed away, the medieval cities of Europe leveled their defenses into fine driveways encircling the historical centers. These new streets retained the old name of boulevard, formerly applied to the wall. These boulevards are a delightful park-like feature of European cities and indicate, even to a stranger, the position of the old fortifications and ditches. Bologna, Nuremberg, Constance, and Chester are among the few old cities that retain the traditional walls. By degrees the term boulevard has been extended to any broad street, especially one bordered or adorned with grass plots and ornamental shade trees and shrubbery.

Boulogne, bōō-lōn′, a French seaport a few miles southwest of Calais. It lies opposite the English port of Folkestone, with which it is connected by daily steamer. The harbor was improved by Bonaparte. He proposed to set sail from this port for the conquest of England, two hours distant. Louis Napoleon was imprisoned here for a short time in 1840. It is at present an important military point both for infantry and artillery. There are a number of interesting buildings, including the Church of Notre Dame. The present population is 55,336. See FRANCE.

Bouquet, boo-kā′, **Henry** (1719-1765), a Swiss soldier. He served in the armies of Holland, Sardinia, and England. During the French and Indian War he came to America as lieutenant-colonel in an English regiment and held various commands in this country. He is affectionately remembered in Pennsylvania for vigorous campaigns carried on against the Indians. In 1763 he checked an Indian massacre by a victory at Bushy Run, near Fort Pitt. The next year he put an end to Indian depredations by a signal victory won at the forks of the Muskingum River, 150 miles west of Pittsburg. The Indians surrendered their white prisoners and sued for peace. Pennsylvania had been

noted for Indian massacres both east and west; but, from this time on, was free from the terrors of the tomahawk and scalping knife.

Bourbon, boor'bon, the last royal family of France. The name is derived from the name of a French province. The first Bourbon king was Henry of Navarre, who came to the throne as Henry IV in 1589. The family was deposed by the French Revolution in 1792, yet was restored in 1815 and again deposed by the Revolution of 1848. Louis Philippe was the last French Bourbon king. The noble family of Bourbon is one of the greatest in France. It rose to distinction in the tenth century. The great constable of Francis I was a Bourbon. Louis XIV, whose reign is considered the most glorious period of French history, was a Bourbon. The present royal family of Spain is a branch of the Bourbons. Another branch occupied the throne of Naples from 1735-1861. The later Bourbons were not progressive. It was Talleyrand who said, after the restoration of the Bourbons in 1815, that they had "forgotten nothing and learned nothing." In politics, therefore, the term is applied to the ultra-conservative, those who are behind the times politically. The Democrats of the United States have been called Bourbons in derision by their political opponents. The Bourbon whiskey of Kentucky takes its name from Bourbon County, in which for a time it was made chiefly. See NAVARRE; HUGUENOT.

Bourdillon, Francis W. (1852-), an English poet. His published works are *Among the Flowers,* a translation of *Aucassin and Nicolette,* etc. He is best known as the author of the exquisite lines:

The night has a thousand eyes,
And the day but one;
Yet the light of the bright world dies
With the dying sun.

The mind has a thousand eyes,
And the heart but one;
Yet the light of a whole life dies
When love is done.

Bow and Arrow. See ARCHERY.

Bowdoin (bō'dn) **College,** the oldest institution of learning in Maine. The charter dates from 1794. The college is situated at Brunswick. It was named for James Bowdoin, governor of Massachusetts, of which Maine was at that time considered a district. The medical school of Maine is connected with the college. There are over 30 instructors and approximately 500 students. The library contains about 110,000 volumes and the building and grounds are valued at $1,000,000. Bowdoin is noted for the many eminent men among its graduates, among whom were Henry W. Longfellow, Chief Justice Melville W. Fuller, Franklin Pierce, Robert E. Peary, Thomas B. Reed and General O. O. Howard.

Bower-Birds, a group of birds, natives of Australia and neighboring islands, so named because the males build bowers, or "play houses" as they are sometimes called. There are several species of bower-birds all belonging to the bird-of-paradise family. They are arboreal birds, feeding largely on fruit, and building their nests in trees. Their plumage is dark and plain, their nests, like those of other birds of the family, are of rude construction, but their bowers are of striking interest. The object of the structure seems to be to attract the female, for when the bower is built the male disports himself therein, strutting up and down, dancing, and displaying his charms. The satin-bird's bower is dome shaped, a few inches long, and floored with twigs. Its ornaments are bright feathers, bits of glass or metal, anything bright in fact. These are arranged within and without the bower and frequently re-arranged by the master of the house. The spotted bower-bird builds a run about three feet long. It is a regular platform of twigs with a hedge of upright twigs at either side. Hundreds of white stones and snail shells are arranged near it. The gardener-bird of New Guinea clears a space about a small tree and erects a circular wigwam of twigs with a cone of moss inside it. There are two doors to this little bower and in front of one of them a carpet of moss is laid, which is kept very clean and made attractive with bright colored insects, fruits, and flowers. When the flowers become withered the bird exchanges them for fresh ones. Some of these strange bowers

have been carried away bodily as specimens. Models of them may be seen in the museums of Washington and New York.

Bowie Knife, a long, dagger-shaped knife, having but one edge. It was named for Colonel James Bowie, an American frontiersman, who was killed in the defense of the Alamo. The knife was popular at first in Kentucky and the southwest. The first bowie knives were made by blacksmiths, usually from flat plow files. The name is now applied to any sheathed hunting knife of the sort. See ALAMO; KNIFE.

Bowling, a game which resembles tenpins. It is played usually in a covered bowling alley. A level track several feet in width and perhaps sixty feet in length is constructed, usually of the best maple flooring laid on edge, and dressed to give as perfect a surface as possible. Ten pins, perhaps two feet in height, shaped like exercise clubs, are set up at one end of the alley. The players station themselves at the other end, and strive to knock down as many pins as possible by bowling a wooden ball from four to twelve inches in diameter along the track. Unless the ball be delivered with accuracy, it will run off into a gutter on either side. If delivered too swiftly, it will clip through the row of pins, knocking down only those in its immediate path; if delivered with insufficient force, it may fail to do much execution. The tenpins stand in the form of a triangle in four ranks of one, two, three, and four pins, respectively. The skillful player aims to strike the single pin of the first rank in such a way that its fall ultimately knocks down all the others. An attendant sets up the pins. He also lifts the balls and places them in an inclined trough along which they roll back to the players. A bowling establishment may contain several alleys arranged side by side with seats for spectators. In England this game is called skittles, the term of bowls being reserved for a game played on a plot of turf or bowling green, with balls like those used in croquet. One ball called a *jack* is placed at one end of the green. The players bowl their balls along the turf. When all have bowled, the player whose balls lie nearest the jack scores. Every player has two balls. The last to bowl has, of course, a great advantage, as he may aim to play his ball between the jack and the balls of his competitors, or he may strike the jack with his ball and drive it into a position more advantageous to himself. It is disconcerting when one's balls lie up nicely to the jack, to have a competitor bowl in and drive the jack to another part of the green. See SKITTLES.

Box, a genus of evergreen shrubs and trees belonging to the Euphorbia family. Box is an alteration of the Latin name, *buxus*. There are about twenty species native to central Asia, eastern Asia, southern Europe, northern Africa, the West Indies, and Central America. The common box, known to botanists as *buxus sempervirens,* or the evergreen box, is native to a belt of territory extending from China to the western end of the Mediterranean. It grows to be a tree twenty-five feet in height, with a trunk not to exceed ten inches in diameter. The leaves are shiny and are oval in shape. They do not exceed an inch and a half in length. The flowers are inconspicuous. The fruit is a globular, three pointed capsule, splitting at maturity into three valves, each valve containing two shining black seeds. The box is of slow growth. The wood is close-grained and has a light yellow color. This species, and a larger species found in the Levant, furnish the boxwood of commerce. Boxwood is much used in the arts. It is the best wood known for the engraver and the flute maker. It is employed in the finest wood turning and carving. A genuine boxwood rule is prized by the carpenter. Box is fairly hardy. It requires well drained soil and does not disdain gravel, but it does better with some shade. Being a slow grower, it stands trimming well. It is a favorite hedge plant in the formal ornamental grounds of Europe. A dwarf variety is planted as an edging for flower beds and walks. Box is propagated usually by cuttings.

Box Elder, a species of maple sometimes called the ash-leaved maple. It is a

rather small tree, but symmetrical, graceful, and of very rapid growth. It is, therefore, a favorite as a shade tree. The wood is of little value, as it is soft and rather brittle. The box elder is found in many parts of the United States. In some localities it is tapped, like the sugar-maple, its sap affording sugar in small quantities. See MAPLE.

Boxers, a secret political society of China. Of course this is not the Chinese name. The object of the organization is to drive out all foreigners, especially Europeans. It is opposed to missionaries, railroads, in short, all changes in the ancient order of society. In one respect the Boxer movement may be regarded a patriotic one. The most serious uprising took place in 1900, when an insurrection rendered the Chinese government apparently powerless. Native Christians and European missionaries were massacred, railroads were torn up, the German minister and the head of the Japanese legation were murdered in the streets of Pekin. The entire diplomatic corps was shut up in the British embassy and cut off from the rest of the world. Ministers and their families were in immediate danger of extermination,—a position from which they were rescued by a relief force of 12,000 men, made up of French, German, Russian, Japanese, and American troops. On the approach of this army the government officials fled with the Boxers, showing their sympathy with the uprising. The affront to international courtesy was, to say the least, a serious one. China was compelled to pay an indemnity of $337,500,000. The amount paid the United States proved excessive. Our government returned a portion to China. See HAY.

Boxing, fighting with the fists which are usually protected with padded gloves to diminish the liability to injury of the opponent. It was a favorite sport among the ancients, but took on a dangerous aspect in the Roman gladiatorial combats, when the contestants wore loaded gloves for the evident purpose of inflicting damage. Professional boxers were common in England a few centuries back, but the sport has fallen into ill-repute. As a training for self defense, it has its merits, but its tendency toward pugilism is to be decried. Prize-fighting, masquerading under the gentler name of boxing, is illegal in most states, though the laws are somewhat variable on the subject. As commonly carried on, boxing is done by rounds of three minutes each with one minute intermission between them. If one contestant is knocked down and is unable to rise within ten seconds, he is "counted out" and his opponent is declared the winner. The match takes place in a "ring," which is really an oblong 16 by 24 feet enclosed by two ropes, the upper one being four feet from the floor.

Boy Scouts of America, an organization of boys, having for its object the directing of the natural energies of boys in such lines as will not only furnish wholesome pleasure, but will develop self-control, resourcefulness, endurance, true courage, in fact, all that makes for manliness and strength of character. The present organization is the outgrowth and union of two movements, one American and one British, which originated in both cases to fill immediate needs. In America, Ernest Thompson Seton invited all the boys of a certain New England neighborhood where he was staying, to camp with him. His real object was to stop their mischievous depredations upon the estate of a friend. The camp was located upon the estate, and Mr. Thompson Seton made the boys so happy, gave them so many new interests, filled their thoughts and their time with so many wholesome activities that they became the immediate and ardent protectors of the estate upon which they had delighted to trespass. They were organized into a band called "Woodcraft Indians." The idea was readily adopted in other places, and organizations of Woodcraft Indians increased rapidly in number.

The British movement began in Africa at the siege of Mafeking. Messengers were needed desperately, and every man being required to protect the women and children in the town, boys were pressed into service. These "Boy Scouts" proved themselves to be brave, efficient and trustworthy.

General Baden-Powell then started the Boy Scout movement in England and the next step was the meeting of Ernest Thompson Seton and General Baden-Powell, who found their purposes so nearly identical, their plans and methods so harmonious, that they agreed to join hands, and together they evolved the idea of the present organization. The Boy Scouts of America was begun in the United States early in 1910. Within one and one-half years troops had been organized in forty-six states, in Porto Rico and the Philippines, in Sweden, Russia, Germany, Italy, and South America, besides, of course, in Great Britain. In the United States, President Taft was honorary member of the national organization, and Theodore Roosevelt was honorary vice-president. Mr. Thompson Seton was Chief Scout. Scout-councils in states and cities are composed of leading men.

In 1922 there were in the United States more than 403,000 scouts and 120,430 scout leaders, a number greater than the combined scout membership in all other countries in the world. The governing body is known as the national council. Wherever practicable local councils are organized to supervise scout activities in the community. Councils of the first class support one or more paid executives and maintain permanent local headquarters. The United States is divided into twelve regional scout districts, each under a regional scout executive, who is appointed by the National Council.

The unit of organization is the troop, whose maximum membership is thirty-two boys. Each troop is made up into patrols of each boys each. The troop is under the control of a scout master who holds a commission from the National Council, and each patrol is under the direction of a boy leader. An applicant must take the scout's oath which is as follows:

I give my word of honor that I will do my best,

1. To do my duty to God and my country.
2. To help other people at all times.
3. To obey the Scout Law.

Having passed his examination and taken the oath he enters service as a tenderfoot. After a month as tenderfoot he may become a second-class scout if he can meet the requirements, which include the ability to lay and light a campfire, to cook potatoes and meat with the utensils of the regulation "kit," and to go a mile in twelve minutes. The applicant for second-class must have a dollar in the bank, and must have a knowledge of the bandaging of simple wounds and of elementary first aid to the injured. To advance to the rank of first-class scout, one must fulfill more difficult conditions along similar lines. Numerous honors and badges are offered first-class scouts in the various lines of out-door sports, nature studies, and such work as involves skill and courage, so that a scout's life may be one of continual progress and development. The Scout Law is embodied in the following nine statements:

1. A Scout's honor is to be trusted.
2. A Scout is loyal to the President, and to his officers and to his parents, his country, and his employers.
3. A Scout's duty is to be useful and to help others.
4. A Scout is a friend to all and a brother to every other scout, no matter to what social class the other belongs.
5. A Scout is courteous: That is, he is polite to all, but especially to women and children and old people and invalids, cripples, etc., and he must not take any reward for being helpful and courteous.
6. A Scout is a friend to animals.
7. A Scout obeys the orders of his parents, patrol leader, or Scoutmaster without question.
8. A Scout smiles and looks pleasant under all circumstances.
9. A Scout is thrifty, that is, he saves every penny he can and puts it in the bank.

The scout's uniform consists of short breeches, shirt, hat of khaki, brown belt, loose handkerchief, dark stockings, haversack, and a staff marked in feet and inches. As much time as possible is spent in the open air. Scouts learn all the details of camp life, including a regular routine in daily habit similar to that required in a military camp. Games to be played in the

woods and on or in the water have been devised. Plants, birds, and animals are studied, in fact all the secrets of woods and waters are fair game for the scout.

The Boy Scout movement has so many features that appeal to all boys and such a wide range of choice for the single patrol or the individual boy, that it fills a long felt want, and is not only helping boys to find themselves, but is helping people to realize that boys are not nuisances to be endured till they grow up but are simply splendid material now, waiting to be turned to good account.

Boycott, an organized movement to ruin a person by refusing to do business with him. The term came into use during the Irish land agitations of 1880 and subsequent years. Capt. James Boycott, agent for an absentee landlord, evicted many tenants and made himself otherwise obnoxious. Testimony before Parliament showed that he was amply punished by being cut. That is to say, the Irish agreed among themselves to have nothing to do with him, either in a social or a business way. The term caught the newspaper writer and is now a word in good repute throughout the English-speaking world. When, for instance, a labor organization passes out word not to deal with a certain tradesman, or not to buy a certain brand of goods, it is said to declare a boycott.

Boycotting was not only used to punish evicting landlords and agents, tenants guilty of paying rent, and tradesmen who ventured to hold dealings with those against whom the Land League had pronounced its anathema; but the League was now strong enough to use this means as an instrument of extending its organization and filling its coffers. Shopkeepers who refused to join and subscribe received reason to believe that they would be deprived of their custom; recalcitrant farmers found themselves without a market for their crops and cattle.—*Annual Register.* 1880.

Boyesen, boi′e-sĕn, **Hjalmar Hjörth** (1848-1895), a Scandinavian-American novelist. He was born at Fredericksvärn, Norway, and died in New York. He was educated at Christiania. When his studies were completed he came to America as editor of a Norwegian journal in Chicago. After studying for two years in Germany he was made professor of German in Cornell University, and later professor of Germanic languages and literature in Columbia College. Boyesen is the author of several novels which indicate imaginative faculty and deep human sympathies. In *Gunnar, A Norseman's Pilgrimage,* and *Ilka on the Hilltop,* he gives memories of his native land. The realism of his later works shows the influence of Tolstoi and Howells.

Boyle, boil, **Robert** (1626-1691), an English chemist of the phlogistic period. Boyle was a quiet, modest man of good family and liberal education. He was a student at Geneva, and later he resided at Oxford, then in London. He took part in the formation of the Royal Society and held the office of president from 1680 to 1691. Boyle improved the air pump and worked persistently with gases. He enunciated Boyle's Law, that the volume of a gas varies inversely with the pressure. Boyle urged that chemistry should be studied to enlarge the bounds of knowledge, not merely to manufacture precious metals and prepare medicines,

See CHEMISTRY.

Boyle's Law, in physics, a principle relating to the elasticity of gases. Every boy who has a popgun knows that air can be compressed;—that the harder he pushes, the smaller the space into which the air is crowded. The smaller the space into which the air is compressed, the greater its expansive force, and the farther it will throw the pellet. About 1662 Robert Boyle, a member of the Royal Society of London for Improving Natural Knowledge, reduced these observations to a principle known as Boyle's Law. It may be stated in two ways. Both come to the same thing:

The temperature remaining the same, the volume of a given body of gas varies inversely as the pressure upon it. Or,

At constant temperature, the product of the pressure and the volume of a given mass of gas is a constant.

Boyle means by this that if twice the pressure be exerted on a given mass of air, it will occupy half as much space, and that if four times the pressure be exerted, the gas will be crowded into one-fourth the space.

This statement seems exceedingly elementary at the present day, when every high school boy is expected to be familiar with it; but it should be remembered that in Boyle's day philosophers were not through yet with the search for some method of converting the baser metals into gold.

The same principle was discovered about 1676 by a Frenchman named Mariotte; hence in French school books the principle is called Mariotte's Law. It should be stated that Boyle's and Mariotte's Law does not hold good for quite all cases; nor does it hold good at high pressures. Stated popularly, one hundred times the pressure does not reduce gas to one one-hundredth of its former volume. Boyle's Law holds good, however, for all ordinary purposes. See BOYLE.

Boyne, boin, a small river of eastern Ireland. It rises in County Kildare and empties into the Irish Sea about thirty miles north of Dublin. It is memorable in Irish history for a victory gained by the Orangemen under William III, July 1, 1690, over the Stuart forces under James II. Over 1,500 of King James' troops were killed. The battle was final. In 1736 a monument 150 feet high was erected by the Orangemen on the site of the battlefield to commemorate their victory. See ORANGEMEN.

Boys' and Girls' Clubs. The movement for organizing the young people in rural communities for more effective work in the schools, on the farm and in home, and to awaken in them a deeper interest in rural life was started in 1896, by a few county superintendents of schools in Illinois, Indiana and Ohio. The agricultural colleges of those states became interested and lent their assistance, and the movement became popular. The pupils of many schools formed corn clubs, pig clubs, canning clubs, and clubs devoted to other agricultural and home interests. In 1908 the Department of Agriculture launched the movement on a national scale and as a permanent cooperative agency in rural education. By 1916 clubs had been organized in every state in the Union and the movement was supported by national and state legislation.

The work is carried on cooperatively by the States Relation Service in the Department of Agriculture and the state agricultural colleges. Over a half million dollars is expended annually in support of the work, and paid lecturers who are agricultural experts are maintained in every county that is willing to pay a part of their salaries.

NATURE AND SCOPE OF THE WORK. The club work is of a practical nature and the boys and girls learn by doing. The members engage in such projects as appeal to their respective tastes, such as raising corn, making a garden or raising a calf or a pig. Household duties such as canning fruits and vegetables, cooking and sewing appeal to the girls. The project may continue for a few days, an entire season or three or four years, depending upon the nature of the work.

The scope of the work depends upon the age of the club members, the time that can be devoted to it and the amount of money that can be extended upon it. There is scarcely a phase of activity in rural life in which these clubs cannot engage. One significant purpose of the club work is to give those who engage in it definite instruction so that in carrying out his project, the member prepares himself to continue that line of work with success. The members engaged in home project work are visited by the teachers, county agents and other leaders in charge of the work. These leaders give definite instruction for carrying on the work, encourage the members to better management and commend well-doing. The local leader is expected to make these visits at least twice a month.

MEETINGS. Each club should hold regular meetings at least once a month. A carefully prepared program should be carried out, and the meeting should be followed by a social period. Occasionally the officers of the club may invite someone to give a talk as a feature of the program, but generally the parts should be taken by the club members. The meetings should be open to the public and invita-

tions should be sent to the parents and friends of the members.

How to Organize a Club. Any school desiring to organize a club should first obtain the approval of the teacher. It is then proper to write the county superintendent and get his approval. At the first meeting a temporary chairman and secretary should be chosen and committees on constitution and nominations should be appointed. The meeting should then adjourn until the committee on constitution is ready to report. At the second meeting a constitution should be adopted and permanent officers elected. The club is then organized and ready for work. The secretary should write the county superintendent and the county agent notifying them that the club has been organized. While the teacher and other leaders should sustain a supervisory relation to the club, we cannot emphasize too strongly the importance of making the members responsible for the management and work. Otherwise the club will not succeed.

Helps. By writing the agricultural college of its State and the States Relation Service, Department of Agriculture, Washington, D. C., a club can obtain information upon any subject relating to its work. Since these institutions print hundreds of bulletins, the letters should be definite

Boz, a pen name of Charles Dickens, as in *Sketches by Boz.* It rhymes with Mose, of which, indeed, it is but a corruption. See Dickens.

Bozzaris, boz-zăr'is, **Marcos** (1790-1823), a Greek patriot. When a young man he served in the French army. On the outbreak of hostilities between Greece and Turkey he threw himself into the movement for Greek independence. He was the commander of the Revolutionary forces at the siege of Missolonghi. The poet Byron was stimulated by his example. Bozzaris was wounded in making a night attack on the pasha, and died at the age of thirty-three without the satisfaction of knowing that he had aided in the liberation of his native land.

At midnight, in his guarded tent,
The Turk was dreaming of the hour
When Greece, her knee in suppliance bent,
Should tremble at his power;
. . . . . .
An hour pass'd on: the Turk awoke:
That bright dream was his last.
He woke to hear his sentries shriek,
To arms! they come! the Greek! the Greek!
. . . . . .
And heard, with voice as trumpet loud,
Bozzaris cheer his band:
Strike! till the last arm'd foe expires;
Strike! for your altars and your fires;
Strike! for the green graves of your sires;
God, and your native land!

—Halleck.

Bracebridge Hall, a series of sketches of English life by Washington Irving. The sketches were published in 1822 over the name of Geoffrey Crayon.

Braddock, Edward (1695-1755), a British general. He was born in Perthshire, Scotland. He was educated for the army, and served in the celebrated Coldstream Guards. He took part in the battle of Fontenoy, 1745. In 1755 he was sent to America as commander-in-chief of the forces designed to dispossess the French in the upper Ohio Valley. He decided to lead an expedition against Fort Duquesne, now Pittsburg, Pennsylvania. His bearing toward the colonists was supercilious. He had infinite trouble in securing horses, provisions, and guides. He was regarded as one of the most thorough soldiers in the British army. He had corresponding contempt for the informality and want of military bearing on the part of the colonists. Capt. Jack, the most efficient scout and Indian fighter in the country, refused to accompany one who wished to subject him to regular military rules. By order of the British government all American officers ranked below those holding commissions in the British army. Braddock recognized the merit of George Washington, however, and made him an aide. Franklin assisted in procuring supplies.

An expedition of 2,150 men finally got under way early in June, starting from Fort Cumberland, Maryland. A month was spent in cutting roads and in bridging streams before the army came within twenty-five miles of the fort. Some of the troops and a large part of the supplies

were left behind at Little Meadows under Colonel Dunbar; the rest pressed forward. On the morning of July 9th Braddock's command turned from the Monongahela River to ascend a ravine. Two hundred Frenchmen barred the way; a large force of Indians lay along either flank concealed in the woods and thickets of the ravine. A terrific battle ensued in which many men and officers were killed, and Braddock was severely wounded. Washington rallied what was left of the Americans and retreated to Little Meadows, where Braddock died. The slain numbered 456. See WASHINGTON.

Braddock, Pa., a borough, is situated on the Monongahela River, 10 miles east of Pittsburgh. It was settled about 1795, on the site of the defeat of General Braddock by a force of French and Indians in 1755. It has extensive blast furnaces, and manufactories of steel rails, steel wire, pig iron and machine tools. It is notable as having the first Carnegie Free Library established in America. Population, 20,879.

Bradford, William (1590-1657), a prominent Pilgrim father. He was born in Yorkshire, England, 1590, and died at Plymouth, May 9, 1657. He was one of the original company that set sail on the Mayflower. He signed the famous compact made in its cabin. After Carver's death Bradford was elected governor of the colony, a position which he filled with the exception of a short interval until the time of his death. He was a man of native dignity and ability. In 1622 Canonicus, the sachem of the Narragansetts, sent him a bundle of arrows tied with the skin of a snake. Bradford, nothing daunted, stuffed the skin with powder and bullets and sent it back again. He wrote a *History of the Plymouth Plantation* from the formation of the organization in 1602 to 1647. The manuscript was discovered in England in 1858, and in 1898 it was presented to the state of Massachusetts, where it rests among the valued archives of the commonwealth. It has been suggested that the family name has been derived from the city of Bradford in Yorkshire, a prosperous manufacturing city of 280,000 people. See PLYMOUTH.

Bradlaugh, Charles (1833-1891), an English statesman. He was born in London. He served in the Dragoon Guards and became a lawyer's clerk. In 1860 he founded a periodical called *The National Reformer.* He was a believer in the doctrine that the duties of the present life are of first importance. He rejected all forms of religious faith and worship founded on revelation. He taught that public education and government should be separated from religious affairs—the complete separation of church and state. In accordance with the British custom of permitting the election of non-resident representatives, Bradlaugh was elected to Parliament from Northampton in 1880. As he refused to take the Parliamentary oath on the ground of religious scruples, he was not permitted to take his seat. Bradlaugh appealed to the country in *The True Story of My Parliamentary Struggle.* He was reëlected, but the House of Commons declared him an atheist unfit to sit. In 1886, a new House having convened, Bradlaugh was seated and the former resolutions forbidding his admission were expunged from the records.

Brady, Cyrus Townsend (1861-1920), a well known American clergyman and author, was born at Allegheny, Pennsylvania. In 1883 he was graduated from the United States Naval Academy, but soon went west in the service of the Missouri Pacific and the Union Pacific railroads. Dr. Brady studied theology in Nebraska, and in 1890 was ordained priest of the Protestant Episcopal Church; and later was elevated to the office of archdeacon of Kansas. Still later, he was rector successively of churches in Philadelphia, Toledo, Kansas City and Mount Vernon, N. Y. During the Spanish American War he was chaplain of the 1st Pennsylvania Volunteer Infantry. Among his works of fiction are *The Island of Regeneration, The Fetters of Freedom, The Better Man, The Wasp's Nest, Under Tops'ls and Tents, The Ring and The Man, The Master of Repartee, The Love Test* and the *Bob Dashaway* series; his serious works are *Sir Henry Morgan, Buccaneer* and *Border Fights and Fighters.*

Bragg, Braxton (1817-1876), an American soldier and general in the Confederate Army during the Civil War. He was born in North Carolina. After graduating from West Point he served in the Seminole War, and in the Mexican War. For gallant conduct in the latter, he was raised to the rank of lieutenant-colonel. At the beginning of the Civil War he was appointed brigadier-general in the Confederate Army and took command at Pensacola. He held several important commands thereafter, defeating General Rosecrans at Chickamauga, and being defeated himself at Chattanooga by General Grant. He was a favorite with President Jefferson Davis, acting for a time as his military adviser. After the war he was for a time chief engineer for the state of Alabama.

Bragg, Edward Stuyvesant (1827-1912), an American soldier. He was born in New York state and was educated for the practice of law, which profession he followed for a time at Fond du Lac, Wisconsin. He entered the Union Army in 1861, and was promoted until he attained the rank of brigadier-general, commanding the "Iron Brigade" in the Army of the Potomac. In 1877 he was sent to Congress by the Democratic party, and served four terms. He was a member of the Democratic national convention several times. In 1902 General Bragg was appointed United States consul-general to Cuba and later consul-general to Hong-Kong, which position he held until 1906.

Brahe, brā, **Tycho** (1546-1601), a celebrated Danish astronomer; a student at Copenhagen, Leipsic, and Augsburg. King Frederick II granted Tycho an island on which he built the finest observatory in Europe. He rejected the Copernican system. He held to the idea of the earth as the center about which the sun and stars revolve, but he did have the other planets revolve about the sun. Tycho was industrious. He catalogued 777 stars and recorded the movements of Mars for years. After the king's death Tycho was neglected, and then so persecuted that he went to Germany and entered upon a professorship at Prague where he was joined by his successor Kepler. He was a wonderfully inventive man. An extinct crater on the moon has been named Tycho Brahe in honor of this astronomer.

Brahma, brä′mȧ, the first person in the Hindu triad or trinity. Brahma is the Hindu creator. Vishnu and Siva, the other members of the triad, are the preserver and destroyer, symbols of good and evil, respectively. In a temple of Brahma at Pushkara, he is represented as having four black faces, each of which is directed toward one of the four quarters of the compass. Each face has two large glass eyes. The four-faced head wears a broad red turban, over which hangs an umbrella. The figure is dressed in red clothes. Brahma is reputed to be the author of the Vedas or sacred books. Inasmuch as he is merely the creator of all things, the Brahmins direct their worship to Vishnu and Siva more particularly. The Brahminical religion is older than Buddhism. It recognizes a system of castes. An important doctrine is the transmigration of souls. Infanticide and the burning of widows on their husbands' funeral piles were Brahminical practices. Brahminical worship consists almost entirely of sacrifices, ceremonies, and observances. See BRAHMANS.

Brahmans, or **Brahmins,** one of the four castes of India. Unlike Mohammedism, Christianity, and Buddhism, Brahmanism cannot be traced to a definite founder. According to the tradition of the Hindu priests, Brahma is God himself, the infinite being. Four castes were created by him. The Brahmans, priests or holy men, sprang from the mouth of the deity. They possess all wisdom. The soldiers sprang from the arms of Brahma; the laborers sprang from his thighs; the lowest caste, the serfs, sprang from his feet. The four castes are by no means allowed to intermarry. The holy Brahman, like the Levite, is supposed to do no work but to live on almsgiving, which is enjoined as a sacred duty. He pays no taxes and must not be punished. He eats no flesh, touches no leather or ordinary domestic animal. He must not eat from a plate or other vessel that has been used

by one of a lower caste, lest he be defiled. At a certain age he must marry. A priest who remains single is not respectable. Theoretically there are four stages in life: Youth, married life, and two subsequent stages of fasting and much ceremonial tending to perfection. In later times, however, the relations and occupations by castes have become much confused. The Brahman may now engage in commercial pursuits and hold office. The Brahmans are a conquering people, differing in blood from the lower castes who represent conquered races.

The foundation of the Brahman religion is ancestral cult, magic practices, a belief in the soul and in spirits, combined with philosophical speculation, and tradition and myths. The *Veda* is the sacred book of the Brahmans. It consists of four books: The *Rigveda,* the *Samaveda,* the *Yajurveda,* and the *Atharveda.* They are the religious teachers of over 200,000,000 people. See BUDDHISM.

Brahmaputra, a large river of Asia, whose source is near the headwaters of the Sutlej and Ganges, on the table-land of Tibet, where it is called the Sanpo. It flows in an easterly direction north of the Himalyas, and after making a sharp curve and passing through these mountains, it enters upon the lowlands of Assam. Its identity with the Sanpo and Dihong was not demonstrated until 1913. After traversing the mountains it is joined from the east by the Lohih or Brahmakunda, when the united stream takes the name of Brahmaputra, literally, "the son of Brahma." After entering Bengal it joins the Ganges at Goalanda, and further on the Megna, and their united waters flow into the Bay of Bengal.

The Brahmaputra is navigable by steamer for about 800 miles from the sea, its total length being perhaps 1,800 miles. A regular steamer service is maintained between Calcutta and Dibrugarh, 800 miles up the river, and vessels with heavy cargo are able to ascend as high as Gauhati.

Brahms, bräms, **Johannes** (1833-97), a German musician and composer, the author of many songs, ballads, choruses and orchestral compositions. He was born at Hamburg, but spent the greater part of his mature life at Vienna. Although a fine pianist he seldom appeared in public, but preferred to devote himself to composition. His choral compositions are given the highest place by critics, but they are difficult, and consequently less frequently heard than his orchestral works. He has been called the modern Beethoven. The *German Requiem* is considered his masterpiece. Other titles are *Rinaldo, Song of Destiny, Noemia, Song of Triumph.*

Braid, a narrow band or tape formed of three or more strands of silk, wool, or other material. Braid differs from woven fabric in that warp threads only are employed, while weaving involves two sets of threads,—those that run lengthwise, called warp threads, and those that run crosswise, called weft threads. In braiding, the warp threads cross and recross the web diagonally.

Barmen, Germany, has long been the center of the braid industry. The materials used for braiding include straw, bast, wire, cotton, worsted, silk, linen, etc.

Braille, Louis (1806-1852), a French educator of the blind. He was blind almost from birth, but was educated at the Institute for the Blind at Paris. As a lad he developed wonderful proficiency in music. He illustrates the principle that a person deficient in one of the senses may become unusually proficient in the others. Young Louis developed remarkable delicacy of ear and touch. At twenty he was the most remarkable organist in France. He invented the system of writing with points. Braille, as his system is known, is now used almost entirely in institutions for the blind. Braille point has superseded the raised letter entirely for purposes of correspondence. The entire system is based on point pricks in paper. Forty-three letters and ten numerals are based on ten fundamental arrangements of from one to four point pricks in a square. A point prick in the upper left hand corner represents A; one in the upper left hand corner, and another immediately beneath in the lower left hand corner, B; four pricks, one in each corner, represent G, etc. See BLINDNESS.

Brain, that part of the nervous system inclosed in the skull. It is continued downward as the spinal cord through an opening at the base of the skull, called the *foramen magnum.*

The cell substance of which the brain is built is exceedingly soft and easily injured by pressure or friction. It is well protected, however, not only by its thick, bony covering, the skull, but by three membranes which entirely cover it. The outermost of these membranes is thick and tough, and fits closely by its outer roughened surface to the inner surface of the bones. Its inner surface, next to the brain, is smooth. This outer membrane is still called by its early Latin name, *dura mater,* which means *hard mother,* because in early times it was thought that all membranes of the body originated from this. The second membrane is like a delicate transparent sac, its sides flattened close against each other. It fits against the smooth inner surface of the *dura mater,* and is called the *arachnoid,* or *spider's web,* because it is so soft and thin. Beneath the *arachnoid* is a third thin membrane known as the *pia mater,* which is Latin for *kind* or *tender mother.* This membrane is composed of a network of blood vessels held together by tissues and it is these blood vessels that supply the nourishment and remove the wastes of the entire brain. It is almost impossible to remove the *pia mater* from the brain, because it dips into every fissure and surrounds all parts.

On examining the brain as a whole we find that it consists of three parts: a large anterior part, known as the fore-brain or *cerebrum;* a narrow middle portion, the mid-brain; and a posterior part, the hind-brain. The fore-brain occupies the greater part of the skull-cavity, and is nine-tenths of the bulk of the entire brain. A deep fissure partially divides the fore-brain into right and left hemispheres. These two hemispheres are united near their under surface by a narrow band of fibers known as the *corpus callosum,* or callous body. The mid-brain is very small and narrow, and carries the optic lobes, two swellings, into which the sensory nerves from the eyes enter. The hind-brain consists of two parts. One of these is just posterior to and beneath the fore-brain, and is known as the *cerebellum;* the other is united at its narrowest part with the spinal cord. This is known as the *medulla oblongata.*

The structure of the brain is very complex, and only the main features can be considered here. In lower animals, such as the frog, the fore-brain, mid-, and hind-brain, lie in a horizontal plane; but in the human being, they are doubled on one another, so that they form a figure something like a question mark (?). The fore-brain occupies all of the upper curved portion of the question mark; the *cerebellum* is below in the upper part of the stem; and the *medulla oblongata* occupies the lowest part of the stem.

If the brain is viewed from the top, only the two hemispheres of the fore-brain are seen. Each of these is seen to be made up of folds of pale gray matter. These folds are numerous, and are arranged so as to form more or less definite divisions of the hemispheres, called lobes. The folds are known as convolutions; the indentations separating the lobes are known as fissures. Each convolution and each lobe bears a definite name, and it is found very useful in the study of normal, as well as diseased brain-activity, to know both the name and the location of these parts.

When the brain is viewed from below, we can see a large part of the underside of the fore-brain, as well as the mid- and hind-brain. Projecting from the fore-brain, on each side of the mid-brain, are the olfactory lobes. Nerves run through these lobes from the nose to the *cerebrum,* and are the means by which is gained a knowledge of the smell of substances. Just back of the olfactory lobes are the crossed optic or eye-nerves, which enter the mid-brain.

Back of the mid-brain is a band of white matter called the *pons,* or bridge, because it connects the two lobes of the *cerebellum.* The *cerebellum* has a wrinkled appearance; but the wrinkles are regularly arranged and really appear like very small convolutions. The surface of the *medulla oblongata* is smooth.

Twelve pairs of cranial nerves can be seen on the under side of the brain. Some of these nerves carry impulses from the brain to the various parts of the head or body, and are called motor nerves, or nerves that cause motion. The nerve which governs the movement of the eyeball is a motor nerve. Others carry impulses from the various parts of the body to the brain, and are called sensory nerves. The optic nerve is sensory. Still other nerves are both motor and sensory, as in the case of the fifth pair of cranial nerves, which carry impulses from the brain to the muscles of the jaws and eyelids, and impulses from the face and teeth to the brain. The tenth pair of cranial nerves is very important. It largely governs the action of the lungs, the heart, and the stomach. It is called the *vagus,* or wanderer.

The above are some of the features that can be noted by observation of the exterior of the human brain. When the brain is cut into halves, in the direction of the median fissure, one finds that it is a hollow organ, with its cavity surrounded by outgrowths or walls. All regions of the brain are connected with its cavity, which, in turn, is connected with the cavity of the spinal cord. During life this continuous cavity is filled with a fluid known as the cerebro-spinal fluid. Its walls are supplied with blood from a network of blood vessels, and it is the rupture of some of these which is one cause of apoplexy.

If we cut into the brain from the top downward we find that its solid parts consist of two kinds of matter, white and gray. In the *cerebrum* and the *cerebellum,* the gray matter, about one-eighth inch in thickness, is on the outside; the white forms the central core of the mass. In the *medulla oblongata* the gray matter is broken up into masses which serve as centers of origin for various nerves.

In the lower animals, as in the frog, the brain is essentially like that of the human; but the various parts are not developed to the same extent as in the human brain. Thus, in the frog, the *cerebrum* is comparatively small and not at all convoluted, but smooth; the mid-brain and the hind-brain are large. The higher the animal in the scale of life, the more complex is the structure of the brain, shown by wrinkling and folding of its surface into convolutions and lobes. Thus, the brain of the chimpanzee, of the horse, cow, and sheep, is more like the human brain than is that of the fish, frog, or bird.

It is thought that these differences in structure are somehow related to the amount and kind of work that can be done by the brain. In all animals the brain controls all the higher work or activities of the animal, such as voluntary movement and sensations. The brain also controls such important operations within the body as the beating of the heart, breathing, and digestion. An animal may have the stomach removed and continue to live; but it cannot survive the loss of the brain.

The results of experimentation indicate that the seat of intelligence, memory, will, and the emotions in man is in the gray matter or cortex of the *cerebrum.* The cortex is also the seat of conscious sensation. By this, we mean that if the gray matter of the *cerebrum* were removed, a human being would be unable to see, hear, taste, smell, or to exercise the sense of touch. A piece of ice might be placed in the hand and no feeling of cold would result. If the sun shone ever so gloriously upon one without a cerebral cortex, everything would seem to such an one in total darkness. Though breathing and other life processes might continue, though movement would be possible, there would be no consciousness of movement. Such a being would show no signs of fear or pleasure; there would be no feeling of hunger nor any desire to move or to work, to sleep, or to talk.

Patient, careful study of the brain has revealed many wonderful things; but much remains still unknown. We know that the brain is made up largely of nerve cells and nerve fibers. The fibers connect the brain with all parts of the body and connect each part of the brain with every other part. The power to think is connected in some way with the activity of the nerve cells; but in just what way, we do not know. Nerve cells seem to generate and receive impulses and sensations; how

they do it, we do not know. The changes which take place in nerve cells are essentially like those which take place in muscle cells. Nerve cells require air, food, rest, and exercise for their continued well-being, as do other cells and tissues in the body. But they can perform a work in the body that no other cells seem able to do. In the same way we know that nerve fibers conduct impulses and sensations. How they do it, we do not know.—ELLEN TORELLE.

Bramante, Donato (1444-1514), an Italian architect who shares with Brunelleschi the credit for restoring the art of building after the fall of Rome. He was born at Monte Asdroaldo, Italy. He was at first a painter, but took up architecture. His first work, done largely at Milan, is so different from his work after going to Rome at the age of 55, that some have questioned whether the work done during the two periods was done by the same man. His masterpiece is the choir and dome of the Church of Santa Maria delle Grazie at Milan. In 1503, Bramante was entrusted with the labor of reconstructing the Vatican Palace and St. Peter's Church. In 1513, the foundation of the present St. Peter's was laid according to Bramante's plan; and although he died the next year, his plans influenced all who later labored at the erection of St. Peter's.

Brandeis, Louis Dembitz (1856-), an American jurist, in 1916 appointed an Associate Justice of the United States Supreme Court. He was born at Louisville, Ky. He was graduated from Harvard University in 1877, and admitted to the bar in 1878. From 1879 to 1916, Mr. Brandeis practiced in Boston. In 1910, he was counsel for Glaves in the Ballinger-Pinchot investigation; in 1911 he was counsel for the shippers in the advanced freight rate investigation before the Interstate Commerce Commission; and in 1914 was counsel for the people during the proceedings involving the constitutionality of the Oregon and Illinois ten hour laws for women. Mr. Brandeis was a member of the arbitration board that settled the strike of the New York garment workers, and has frequently appeared in trials and hearings involving reforms in working days for women and children, a minimum wage, etc. His appointment to the Supreme Court was confirmed by the Senate over strong opposition.

Brandenburg, a province of Prussia, with an area of 15,070 square miles, and a population (1919) of 2,445,627. It is a flat, marshy country, and has a great many rivers, lakes and canals. Its chief rivers are the Oder and the Elbe, and there are some 650 lakes within the province. The climate is cold in the winter and hot in the summer. The province has a sandy soil naturally, and only through artificial means has it been made fertile. Agriculture and the raising of live stock are important industries.

Manufactures are highly developed: there are extensive silk, woolen, linen, yarn and cotton cloth mills, and there are numerous establishments for dyeing, spinning and printing the different textiles. There are many machine shops, cigar and cigarette factories, glass and chemical works. The manufacture of garments is carried on extensively.

Brandenburg is very old and was inhabited at the beginning of the Chritian era by different Teutonic races. There have been numerous political changes, under many different rulers since that time, but since 1701 its history has been a part of that of Prussia.

Brandenburg is the capital of the province, situated on the Berlin and Magdeburg railroad, about 37 miles from Berlin. Population, 52,972.

Brandes, brän'des, **George Morris Cohen** (1842-), a Danish author. He was born in Copenhagen, of Jewish parents. His early life was spent in France and Germany. A course of lectures, delivered at the University of Copenhagen and published under the title of *Main Currents in the Literature of the Nineteenth Century,* made him unpopular in Denmark on account of its radical line of thought. Brandes soon after removed to Berlin where most of his work has been done. Brandes' writings are in the line of literary criticism. Among them may be mentioned *Danish Poets, A Story of Ibsen, Aesthetic*

Studies, Life of Benjamin Disraeli, and *William Shakespeare, the Man and His Works.* Brandes ranks high as a critic, and it is said that to him is due the credit of having first brought to bear upon Danish literature the influence of modern literary aims and tendencies.

Brandon, a city in Manitoba, on the Assiniboine River, 133 miles west of Winnipeg. It is served by the Canadian Pacific, the Canadian Northern and the Great Northern railways. It is the distributing center for a rich agricultural section. There are numerous wholesale houses, farm implement distributing houses, and various industries manufacturing chiefly agricultural supplies. The city owns electric light, street railway, and water systems and a central steam-heating plant. It is the seat of Brandon College, affiliated with McMaster University, Toronto. Population, 1921, 15,397.

Brandywine, Battle of, a battle of the Revolutionary War, fought at Chadd's Ford, Pa., on the Brandywine Creek, Sept. 11, 1777, between 11,000 Americans, under General Washington, and some 18,000 British under General Howe. The American loss was estimated at 1,000, the British at 600.

Brant, Joseph (1742-1807), a Mohawk chief, and a friend of the British. He was born in the Mohawk Valley, his Indian name being Thayendanaga. His brothers took part in Sir William Johnson's campaign against the French at Lake George. Johnson became interested in the boy, then only thirteen years of age, and sent him to a school for Indians at Lebanon, Connecticut. Later he took the name of Joseph Brant and became interpreter to a missionary. He was employed frequently as agent to various Indian tribes. The Mohawks espoused the British cause during the Revolution and Brant attained the rank of colonel in the British army, showing himself both a brave soldier and a humane man. After the war he was employed several times by the government in making treaties among the Indians. Brant interested himself also in work among his fellow Indians in eastern Ontario. He translated the Gospel of Mark and the English Prayer-book into the Mohawk language. At Brantford, Ontario, a bronze statute has been erected to his memory.

Branting, Karl Hjalmar (1859-), a Swedish statesman, was born in Stockholm. He is by profession a journalist, and has edited *Social-Demokraten,* of Stockholm. He has been a member of the Swedish Parliament for upwards of 25 years. He is a practical socialist and an opponent of militarism and autocracy. Branting became Premier of Sweden in 1920, which position he held for six months, again becoming Prime Minister in 1921. As Premier his program has included such projects as reform of municipal taxation; treatment of the housing problem; reform of the defense system, etc. One of the foremost European socialists, his influence has been felt both in Great Britain and Germany. He took a prominent part at the Genoa Conference in June, 1922. The Nobel peace prize of 1921 was awarded to him and Christian Larson, of Norway.

Brass, an alloy of copper and zinc. Ordinary brass is composed of two parts by weight of copper and one of zinc. Brass is harder than copper and is more handsome than zinc. Its bright yellow gives it the appearance of gold. It is much used for ornamental metal work of all sorts, such as gas fixtures, hinges, door plates, hand rails, boxings, eyelets, tubing, wire, kitchenware, and clockwork. Much that passes for brass is really bronze. Brass is very suitable for the making of castings, as it retains its full size in cooling. The surface is usually polished in a turning lathe. It is not known whether brass was in use before the time of the Romans. A form of brass known as pinchbeck is used to make cheap jewelry. An alloy consisting of three parts of brass and two of zinc may be drawn out under the hammer when heated. Brass castings are made by pouring the molten metal into molds. Sheet brass is made by rolling ingots in a rolling mill, and brass wire is made by the same process as steel wire. (See WIRE). The center of the brass industry in the United States is in western Connecticut. The manufacture of brass and bronze was greatly extended by the World War and

during 1919. In that year the output amounted to 900,357,793 pounds. In 1920 the production fell to 80,734,979 pounds. See ALLOY; COPPER; ZINC.

Brazen Age. See HESIOD.

Brazil, a large republic of South America. Its area is 3,218,130 square miles. It occupies a full half of the South American continent, and is larger than either Europe or the United States. It borders on every country of South America, except Chile, and has a coast line of over 4,000 miles. The census of 1920 shows the population to be 30,645,296, an increase of 13,000,000 in twenty years. About one-third of the population is white. Settlements are confined chiefly to the Atlantic coast.

Brazil was discovered in 1499 by Pinzon, a companion of Columbus. He took possession in the name of Spain, and took home a cargo of drugs, gems, and brazil wood for dye. In 1500 Cabral, a Portuguese navigator, was driven by adverse winds upon the Brazilian coast. He landed on Easter Day. He erected an altar, celebrated mass, and, declaring the country a possession of Portugal, he erected a stone cross to commemorate the event. Amerigo Vespucci, for whom the country was subsequently named, explored the coast of Brazil in 1501 and 1503. He also took possession of the region in the name of Portugal. He built a small fort, but just where is not known. He left a garrison of twelve men, and sailed for home with two shiploads of Brazil wood, parrots, and monkeys. A struggle that arose later between Spain and Portugal was settled finally by the pope, who allotted the eastern part of South America, or Brazil, to Portugal, and the western part, or the Andean region, to Spain. Bahia, the early capital, had a prosperous Catholic university a century before the Pilgrims set foot on Plymouth Rock.

In 1808 the Portuguese court was transferred from Lisbon to Rio de Janeiro to escape Napoleon's domination. In 1821 the royal family returned to Portugal, leaving Dom Pedro, a son, as regent. A year later a revolution broke out. The only European throne in America was overturned, independence was declared, and Dom Pedro was proclaimed emperor of Brazil. In 1889 a republic was organized with a constitution resembling that of the United States.

The majority of the people are Catholic. Portuguese is the official language. Indians and negroes counted, about 85 per cent of the population is unable to read or write. There are large colonies of German and Italian settlers in the southern states of Brazil.

Brazil occupies about seven-eighths of the width of South America. The eastern portion corresponds to the Appalachian system of North America. An immense mass of mountains, older than the Andes, has been worn down by wind and water into a highland. It slopes toward the lowlands of the Amazon and the Paraguay that sweep around it in a continuous waterway. The highlands stand like an immense island with the highest shore along the Atlantic coast. The highest elevation, 10,340 feet, is near Rio Janeiro. The highlands have mineral wealth, as yet but partly explored. Coal, iron, gold, mercury, lead, copper, and zinc are known to exist in abundance. The emerald, ruby, topaz, and amethyst are found in various localities. Brazil was at one time the leading country of the world in the production of diamonds.

Brazil is an agricultural country. It leads the world in the production of coffee. The annual crop is worth about $300,000,000. Next in value are sugar, tobacco, cotton, and Paraguay tea. Of natural products rubber, cocoa, timber, dye woods, drugs, and nuts are the chief. Meats, hides, wool, and goat and sheep skins are exported largely. Brazil does business chiefly with England, Germany, and the United States.

One of the greatest events in the recent history of Brazil was the international exposition held in 1922-23 to celebrate the centennial anniversary of its independence. The United States made an appropriation of $1,000,000 for participation in the exposition, and the other South American countries coöperated to the fullest extent.

STATISTICS. The following statistics are

the latest to be had from trustworthy sources:

Land area, square miles	3,275,510
Forest area, square miles	1,250,000
Population (1920)	30,645,296
Indians	600,000
Chief Cities:	
Rio de Janeiro	1,157,873
Sao Paulo	504,300
Belem	348,130
Pernambuco	216,484
Porte Alagre	150,343
Number of states	22
Members of senate	63
Members of chamber of deputies	212
National revenue	$ 56,500,000
Bonded indebtedness	$500,000,000
Farm area, acres	159,080,000
Tobacco, pounds	53,900,000
Sugar cane, short tons	579,569
Cotton, bales (500 lbs.)	451,000
Cocoa, tons	60,000
Sugar, tons	300,000
Rubber, tons	41,500
Coffee, bags (132 lbs.)	8,030,000
Domestic Animals:	
Horses	7,289,690
Mules	3,207,940
Cattle	30,705,400
Sheep	10,633,000
Swine	18,399,000
Manufacturing establishments	11,335
Capital invested	$359,465,000
Operatives	151,841
Output of manufactures	$400,430,000
Cotton goods, yards annually	80,000,000
Imports	$605,359,000
Exports	$523,163,000
Miles of railway	18,708
Teachers in public schools	20,590
Pupils enrolled	700,120

Brazil Nut, a much esteemed nut from the forests of the Orinoco and Amazon. The Brazil nut has a number of familiar names, as cream nut, niggertoe, and Para nut, the last name from the port of Para whence it is exported chiefly. The tree on which Brazil nuts grow is a large, straight tree that rises to a height of one hundred feet before branching. The nuts are globular, and are about the size of a person's head. They weigh several pounds and, when ripe, fall with tremendous force, rendering it positively dangerous to be abroad. Each nut contains from eighteen to twenty-four of the three-sided, wrinkled kernels known in the market. They are fitted in by nature with such art that, once disturbed, the skill of man cannot replace them. Indians gather the nuts, break them open and bring the kernels down stream to market. Buyers have of late established trading stations farther up the streams nearer to the Indians in the remote nut country, and the industry is increasing. The port of Para sends half a million dollars' worth to London annually. On pressing, the nuts yield a fine quality of watchmaker's oil. See NUT; BRAZIL; AMAZON.

Bread, a preparation of flour baked for food. Well made bread is one of the most nutritious of foods. It contains so nearly all the ingredients required by the human body that, in case of need, a person can live on bread and water without loss of health. The simplest bread is made of flour mixed with water and baked. Ship's biscuit is made in this way. It keeps well, but it is as hard almost as flint, and tries a sailor's teeth severely. Unleavened bread is mentioned in the Scriptures. Hoecake or cornbread and oatmeal bannocks are made in much the same way, but the baker has learned to make better bread from wheat flour. For an account of the way in which bread is made light and spongy, the reader is referred to the article on YEAST.

It has been found that the loss of food by the conversion of sugar into gas and into alcohol, and their subsequent expulsion in baking, amounts, according to one authority, to seven loaves out of one hundred and seven. To save this loss, experiments have been made to secure lightness and elasticity by forcing air into the dough. Bread made in this way, without being set and raised with yeast, is called aerated bread. It is a very attractive, wholesome sort of bread, but it lacks the taste and permanent popularity of yeast-raised bread. Baking powders for the purpose of raising bread are all made on the general plan of a harmless chemical compound in the form of a powder that may be mixed with flour, and that will generate a quantity of gas when wet in the dough and subjected to the heat of baking. Cream of tartar and saleratus or baking soda are varieties well known to the housekeeper. They do not produce as light biscuit as yeast, but they are quicker in action.

A long controversy as to the comparative

nutritive value of white bread, brown bread and graham, appears to have been decided in favor of white bread. Coarse breads, like graham, named after an eminnent London physician, is perhaps more easily digested, but as for health, the choice lies with the individual.

The best temperature for baking bread is 450° to 550° Fahrenheit, which brings the interior of the loaf to the boiling point, or 212° Fahr. The starch of the flour is rendered soluble by the heat in baking, fermentation is stopped, and the alcohol formed in the fermenting process is driven off. The outside crust is formed more rapidly if the loaves are wetted before placing them in the oven, and in large bakeries the crust is sometimes glazed by injecting steam into the oven, which also serves to keep the inside of the bread moist. Crumb and crust differ from each other both chemically and in structure owing to the different degrees of heat to which they are subjected. The action of the more sudden and intense heat upon the crust decomposes the starch into dextrin and maltose, and the surface of the loaf hardens with a brown color and sweeter taste.

In cities most of the bread consumed is mixed by machinery and baked in large establishments with a minimum of hand labor. Wheat bread from bakers' flour, and rye-and-wheat bread contain the largest amount of protein of all the common kinds, with about 39 per cent of water and 48 per cent of carbohydrates. Corn bread (johnnycake) and wheat rolls contain the most fat. Crackers contain the least water and a high percentage of protein. See WHEAT; YEAST.

Breadfruit, the most important food plant of the South Sea Islands. The fruit grows on a low tree at a height of ten or twenty feet from the ground, and hangs from the branches in clusters of three or four, looking something like rough, furry muskmelons. The fruit is ready for use just before it is ripe, but, as there are several varieties ripening at different seasons and each tree produces two or three crops a year, the native has little difficulty in finding suitable fruit for his dinner the year around. We can get an idea of breadfruit and the origin of its name by considering that it is filled with a sort of dough. The native digs a pit, puts hot rocks in the bottom, some fresh leaves on the rocks, slices of breadfruit on the leaves, more leaves and stones on these, then more leaves and breadfruit if he likes,—finally covering his pit with earth for half an hour. His bread is then ready to eat hot from the oven. Sometimes stones are heated and a huge pit is made by the efforts of a whole village, and enough bread is baked to last a month or two. Sometimes the entire fruit is baked and is eaten from the shell. A. R. Wallace in his *Malay Archipelago* says: "With meat and gravy it is a vegetable superior to anything I know, either in temperate or tropical countries. With sugar, milk, butter, or treacle (molasses) it is a delicious pudding, having a very slight and delicate but characteristic flavor, which, like that of good bread and potatoes, one never tires of." The breadfruit may also be sliced and dried in the sun to be afterward ground into flour.

Breakwater, a structure at the entrance to a harbor for the purpose of breaking the violence of the waves. The greatest breakwater ever constructed is that at Cherbourg, on the French side of the English Channel. The common method of erecting a breakwater is to sink loads of rough stones, allowing time for them to settle under the action of tides and currents. Then when the piles of stone reach almost to the surface, the top is covered with masonry, sloped as seems best to resist the action of the water. Other breakwaters are built of wooden beams partly under water and attached by chains to some immovable body or bodies. In passing through such a structure the force of the breakers is greatly lessened. See CONCRETE.

Breckenridge, John Cabell (1821-1875), an American statesman and soldier. He was a native of Kentucky, received his education at Center College in that state and undertook the practice of law. He served in the Mexican War, later was sent to the Kentucky legislature, then to Congress and in 1856 he was elected vice-presi-

dent on the ticket with Buchanan. Again in 1861 he was sent to the United States Senate, but resigned to enter the Confederate Army, where he rose to the rank of major-general, serving in many of the important engagements of the war. In 1865 he became secretary of war in Jefferson Davis' cabinet. After 1868 Breckenridge returned to the practice of law in Kentucky.

Bremen, brĕm′en, an important commercial city of northwestern Germany. It is situated at the head of deep-water navigation on the Weser River, thirty-seven miles from the North Sea. Bremerhaven at the mouth of the Weser is its port, though ships drawing no more than seventeen feet of water may ascend to Bremen. With ninety-nine square miles of territory, the city is free, practically forming an independent state of the new German Republic.

Among the cities of Germany, Bremen ranks next to Hamburg in foreign commerce and is the headquarters of the North German Lloyd line. Before the World War, about 3,000 vessels annually cleared the port of Bremen, but, though exact figures are not available, it is known that the volume of trade has greatly decreased since 1914.

In 788 Bremen was granted a bishop by Charlemagne. The city was a member off and on of the famous Hanseatic League. Bremen is a typical German city. The old walls have been leveled to make way for boulevards. At the center is a marketplace and a fine old city hall with stained glass windows, great hall, and a handsome carved stairway. A cathedral, a Gothic exchange, numerous statues of celebrities, fountains, queer old gables, crooked streets, and quaint shops make the city a delightful place for a ramble. Population, 269,806.

See GERMAN EMPIRE; HANSEATIC LEAGUE.

Brenner Pass, a pass in the main chain of the Alps between the headwaters of the Adige and the Inn. It affords a line of communication between Austria and the Valley of the Po. Its highest point is 4,658 feet above the sea. It is about twelve miles long and is open during the entire year. It was the pathway of the Roman legions on their way to the upper Danube, and it was through this pass that the Austrians maintained their grip on the fertile plains of Lombardy. A railway connecting Austria and Italy was built in 1867. Although mountains rise to a height of 3,000 feet on either side, the pass is considered less picturesque than that of other alpine routes.

Breslau, brĕs′lou, the second city of Prussia. It is situated in the far southeast corner on the upper waters of the Oder. It is the capital city of Prussian Silesia. It was wrested from Maria Theresa by Frederick the Great in 1741. The modern city has a population of over half a million and carries on an extensive trade in cloth, timber, coal, glass, and grain. Wool fairs are held in June and October. The manufactures include engines, cars, musical instruments, stained glass, cigars, beer, and textiles. The old wall has been leveled to make room for pleasant, shady promenades and drives. The moat has been converted into a series of ponds now enlivened with swans. A zoölogical garden and a botanical garden, museums of art and antiquities, a university library of 400,000 books, including specimens of the earliest printing, a fine old city hall, several churches with stained glass, a market place, numerous statues, and quaint houses, of interest to tourists.

Brest-Litovsk, Treaty of. In 1917 the Bolsheviki came into power in Russia and announced their intention of negotiating with the Central Powers a separate peace, which was signed at Brest-Litovsk, a Polish border town, on March 3, 1918. The Germans imposed outrageous conditions which the majority of the better-class Russians bitterly opposed but were helpless to prevent. The Germans treated separately with the Ukraine, declaring their reason for doing so was that the population had already, through its representatives, proclaimed its independence of Russia.

Failing to extract the food and concessions expected of the people, in revenge, notwithstanding the treaty, warfare was

continued until the general Allied Armistice of Nov. 11, 1918. The Paris terms annulled the Brest-Litovsk document.

Breton, bre-tôn′, **Jules** (1827-1906), a French painter. He was educated at Douai and in a studio in Paris. The subjects of his earlier pictures were taken from the French Revolution. Later, following the example of Millet, he turned his attention to peasant life. Some of his more famous paintings are *The Angelus Bells, The Song of the Lark,* and *The Shepherd's Star.* A number of Breton's pictures have been purchased by Americans. *The Angelus Bells* hangs in the Chicago Art Institute. *The Gleaners* is owned by James J. Hill of St. Paul; *The Evening Call* by Thomas B. Walker of Minneapolis. Breton fared well financially. For a time he painted under a contract with a Paris art dealer who took his canvases at $2,500 each. Later, when he could afford to do so, he held his pictures at a still higher price. The *Communicants* sold lately at $48,000. The pictures painted for the art dealer mentioned, now that Breton is dead, command $25,000 readily. The work of Breton is often compared with that of his friend, Jean Francois Millet, who also painted peasant life. See MILLET.

Millet, a peasant himself, showed the life of his people with the feeling of one in whose veins was the blood of peasants; Breton, the man of the middle class, drew them as one who had learned to love these simple people by long meditation on their lives, and worship of nature to which they seem so near.

The dignity of labor, the rewards of toil are in Breton's pictures, the lovely, the ideal side of the lives of these workers. We might write under all his peasant pictures: "From labor health, from health contentment springs;" under those of Millet: "In the sweat of thy face shalt thou eat thy bread"—the primal curse.

Breviary, brē′vĭ-a-ry, an abridged prayer book containing the daily offices of the Catholic clergy. It was arranged by Pius V about 1568. It contains the Psalms, passages from the Old and the New Testament, and passages from the church fathers,—all in Latin. The English Book of Common Prayer is modeled on the plan of the Roman breviary.

Brewer, David Joseph (1837-1910), an American jurist, for twenty-one years associate justice of the United States Supreme Court. The son of a missionary, he was born at Smyrna, Asia Minor, but received his education in the United States, graduating from Yale in 1856, and preparing for the law at Albany Law School. He began to practice law at Leavenworth, Kansas, and was in turn, probate judge, district judge, and justice of the state supreme court. He became, in 1884, United States circuit judge and in 1889 was appointed associate justice of the supreme court. He is the author of a book entitled *American Citizenship.*

Brewing. See BEER.

Brewster, William (1560-1644), the leader of the Pilgrim Fathers, who founded the Plymouth colony in Massachusetts in 1620. He was born at Scrooby, England, and was educated at Cambridge. Fleeing to Holland with the Separatists in 1608, he taught at Leyden. He came to the New World in the Mayflower, and as long as he lived was a preacher and leader in Plymouth. See PILGRIMS.

Briand, Aristide (1863-), a French statesman and the first Socialist to become Prime Minister of France, was born at Nantes. He was educated for the law, and spent about 15 years of his early life as barrister, trade unionist, orator, journalist, congressman, and as general secretary of the Socialist Party of France. He wrote for such journals as *La Lanterne, L'Humanite,* and *Le Petite Republique.* In 1902, he went to the Chamber of Deputies as a Socialist, where his oratory won him instant recognition; and in 1906 he became Minister of Public Instruction and Worship. In 1909 he was chosen Prime Minister, and was soon expelled from the Socialist Party on the charge of having become anti-Socialistic. Mr. Briand broke the great railway strike of 1910 by summoning the strikers to the colors, thus exposing those who persisted in striking to the charge of insubordination and breach of military discipline. He was Prime Minister again in 1913 and in 1916, and was succeeded by Clemenceau in 1918. Upon the retirement of Clemenceau, soon after the Peace Conference, Briand was called for the fourth time to

form a ministry. He headed the French delegation to the Washington Conference in 1921, but resigned after his return to Paris.

Brick, a well known building material. Bricks are really a kind of coarse, porous, unglazed pottery, made from common clay. Almost any reasonably clean clay answers the purpose. It must be free, however, from limestone pebbles, lest the burning convert them into lime which would later absorb water and slake, causing the brick to chip or split open.

Brickmaking is not a complex process. Brick clay, fuel, and water are the essentials. If necessary, the clay is first screened to free it from pebbles. It is then ground, mixed with water, and worked into a plastic, stiff mud in a mill or large wooden barrel in which paddles driven by machinery stir the mass thoroughly. The well kneaded clay is pushed out at the bottom, and is molded or cut into bricks. The largest brick machines turn out 30,000 bricks a day. The green bricks are stacked up under light sheds to harden for a few days. Care must be taken not to let them dry too fast lest they crack.

The air-dried bricks are then built up in large kilns properly constructed to allow the flames to race through channels at suitable intervals. Wood or coal and, in some localities, gas, is used for fuel. The firing should be light at first and should increase gradually in intensity. For common brick the heat should reach 1,800° F., and for paving brick the heat should be more intense. The more intense the heat, the more the ingredients, especially sand, which is present in all brick clay, are melted together in a glassy fusion. Fire bricks, in fact, are made of clay containing a large degree of sand and are fired to such a degree of heat that they are afterward virtually fireproof and will neither crack nor warp. They are brittle, however, and in a wall require to be backed by common brick.

The red color of some bricks is due usually to the presence of iron. The redder the brick, the more iron. Dark brown brick also owes its color to burnt iron. Yellow and cream colored brick derive their color from lime and iron.

An ordinary brick is $2 \times 4 \times 8$ inches. Bricks are manufactured, sold, and laid in walls usually at a price per thousand. A chimney builder plans his dimensions in multiples of four inches, allowance being made for mortar. In addition to the regular size, bricks of a thousand conceivable shapes and sizes may be ordered for special cases. Latest reports show 2,414 manufacturers of brick, tile, etc., in the United States, with capital of $355,000,000, employing 77,000 wage earners, with an annual product valued at $210,000,000.

The earliest brickmaking of which we have remains was doubtless carried on by the Babylonians and Egyptians in the grain producing valleys of the Euphrates and the Nile, where both timber and stone were lacking. Sun-dried bricks 4,000 years old may be found in a state of excellent preservation. Straw was used to give the bricks greater coherency. For a story of the Egyptian taskmasters who forced the Israelites to gather their own straw from the stubble fields, see Exodus i: 14; v: 4-19.

See ADOBE; CLAY.

Bride of Lammermoor, The, a romance by Sir Walter Scott, published in 1819. The story belongs in the third series of *Tales of My Landlord*. It is a tragic tale, laid in Scotland in the days of William and Mary. The "Bride," Lucy Ashton, is forced by her mother and friends into a marriage with Bucklaw, while loving and betrothed to Ravenswood. On the night of the wedding Bucklaw was found severely wounded in the bridal chamber. Lucy died shortly after in convulsions. At Lucy's funeral, Ravenswood accepted a challenge from her brother. Riding to the place appointed for the duel, the unhappy Ravenswood disappears, evidently drawn by the quicksands into the "Kelpie's Flow." Thus was fulfilled the old prophecy:

When the last Laird of Ravenswood to Ravenswood shall ride,
And woo a dead maiden to be his bride,
He shall stable his steed in the Kelpie's flow,
And his name shall be lost forevermoe.

Bride of the Sea. See VENICE.

Bridge, a construction by which a passage is secured across a body of water or an open space. The simplest bridge is a log or slab of stone with an end on either shore. The first step in advance is to lay two or more beams parallel and cover them with flooring. All bridges of this sort depend on the stiffness of the material and its ability to stand the strain of *bending*. A great many small bridges of the present day, floors, and flat roofs are of this sort.

Another kind of bridge may be represented by a spider's thread by means of which the spinner crosses an open space. The ends are made fast to the opposite shores and the thread sustains the weight of the spider by reason of its tensile strength, or ability to stand the strain of a *stretching* force. The circular orb web of the spider seen in dewy meadows is a bridge of this sort. The natives of farther India bridge streams by means of long canes of rattan. The ancient Aztecs of Mexico and the Peruvians understood the art of bridging chasms by means of vines and cables. Some of the finest bridges in the world, as the Brooklyn Bridge, the Suspension Bridge at Niagara Falls and the Williamsburg Bridge across the East River at New York and some European bridges are suspension bridges. They are supported on wire cables of great tensile strength.

See ARCH ; ARCHITECTURE.

A third sort of bridge is built of short pieces of material, disposed in the form of an arch. The strength of a well built arch depends on the ability of the material to withstand *crushing*. The Romans were the first to use material of this sort extensively in bridging. Bridges of stone and brick are common in all civilized countries. Before the introduction of iron construction, the bridges of cities and important roadways were built on arches. The bridges over the Seine in Paris and the famous London Bridge are of this description. Roman aqueducts and military roads were laid over arched bridges.

If we add the ability to resist pressure from the ends, ability to resist doubling-up force such as is possessed by braces, piling, or the legs of a chair, we have the four kinds of strength utilized by the modern bridge builder. The iron pillars that support warehouse floors and the wooden trestlework of railroad bridges afford examples of material resisting a stress of this sort.

The truss is an admirable invention. It is a frame designed to take the place of the beam required in the first kind of bridge described, or of the arch of masonry. By a very simple but shrewdly devised plan, light beams, braces, and tie-rods are so combined that when the ends of the truss are supported it cannot bend without pulling the tie rods in two. A truss is much lighter and less expensive than a beam of equal strength. Iron trusses longer than any possible beam are entirely practicable and are able to sustain enormous loads.

The cantilever bridge usually consists of two trusses and a central span. Each truss has a shore arm and a river arm which balance on the supporting pier. In short bridges the central span is frequently dispensed with, the river arms of the trusses taking its place.

The Romans were the great bridge builders of antiquity. Their first bridges were of wood. A stone bridge was built over the Tiber about 127 B. C. The Emperor Trajan built a bridge over the Danube forty-six feet above the water. The first stone bridge of which we have any record in England was built near Stratford in 1087. The first stone London bridge was built in 1176. An iron bridge was thrown over the Severn in 1776. It had a 100 foot span and 45 foot rise. Iron is now the prevailing material.

The longest bridge in the world is said to be one crossing the Danube, having a length of 12,705 feet. There is a very long bridge across Galveston Bay, Texas. Brooklyn Bridge is said to be the ninth in length. The highest bridge in the United States is a railroad bridge crossing the Pecos River, Texas. It is 321 feet high. The highest bridge in the world is a new cantalever bridge crossing the gorge of the Zambezi River at Victoria

Falls, South Africa. It is 650 feet long and 420 feet in height. A fine cantalever steel bridge crosses the River St. Lawrence six miles above Quebec. It has a span of 1,800 feet. It is high enough to clear the tallest ship. Tubular bridges consist of wrought iron tubes large enough for railroad tracks to be laid within them. The only bridge of this type is over the Manai Strait, Wales. That formerly crossing the St. Lawrence at Montreal has been replaced by a steel truss bridge.

Bridge of Sighs. See VENICE.

Bridgeport, a manufacturing city of Connecticut. It is situated on an arm of Long Island Sound, about fifty-six miles from New York City. It is a railroad and steamboat center, and a city of unusually fine appearance, with well-constructed buildings and pleasant environment. A fine esplanade overlooks the Sound and is an added attraction. Among its manufacturing products are steel and rubber goods, ammunition, hardware, cutlery, sewing machines, typewriters, carriages and automobiles. There are numerous public institutions, buildings, churches and schools; also several fine parks. The population in 1920 was 143,538.

Bridges, Robert (1844-), English poet and physician, and poet laureate since 1913. He was educated at Eton and Oxford; and studied medicine at St. Bartholomew's Hospital, London, receiving a number of important hospital appointments before his retirement from practice. Dr. Bridges has published eight plays, none of which are generally known, and several volumes of poems. Until 1913, when he succeeded Alfred Austin as poet laureate, the work of Dr. Bridges was not well known. His popularity was won when his collected works appeared, issued by the Oxford University Press in 1913. Among his finest poems are *Eros and Psyche, Prometheus, A Passerby,* and *Achilles in Scyros.* He is essentially a scholar's poet, never striking the popular note, as have some of his contemporaries.

Bridgman, brĭj'man, **Laura** (1829-1889), a noted American woman. At the age of two she was attacked by a fever and lost her sight, her hearing, and sense of smell. She may be described, therefore, as a blind deaf-mute. She is noted in the annals of education for the great ease with which she learned to sew, to knit, to read, and to write. She had a touch of marvelous delicacy. By placing her fingers against the lips of a speaker, she could understand what was said. She learned to write with rapidity and accuracy. Anyone whom she had ever met, she was able to recognize by the mere touch of the hand. She became well versed in geography, history, and literature. She became a teacher in a Boston Institute for the education of the blind. She carried on an extensive correspondence with the deaf-mutes throughout the world and was very happy in her work and friends. See BLINDNESS.

Brigade, a group of regiments united temporarily for military purposes. A colonel or lieutenant-colonel of one of the regiments is appointed brigadier-general. When the brigade is broken up he returns to the command of his own regiment. See ARMY.

Bright, John (1811-1899), an English statesman. In 1843 he entered Parliament for Durham. John Bright came into prominence as an advocate of the people for the repeal of import duties on foodstuffs. The Anti-Corn-Law League was established largely through his efforts. During the American Civil War John Bright was an outspoken supporter of the Union cause. He favored the extension of the right to vote to workingmen. He aided in relieving the Catholics of Ireland from paying the expenses of the Protestant church. See CORN LAWS; COBDEN.

Bright's Disease, a breaking down of the tissue of the kidney. It may be due to a severe cold, to scarlet fever, and other infectious diseases, to poisoning by alcohol, to prolonged nervous strain, or to other causes. A mere inflammation, or the acute form, is cured usually by rest; but a disintegration of the tissues, known as the chronic form, cannot be cured. The progress of the disease may, however, be arrested. Instances have been known in which patients lived for years until carried

off by another disease; but, generally speaking, once Bright's disease has secured a firm hold on the kidneys, the patient is likely to be carried off at any time. Richard Bright, whose name is associated with the disease, was an eminent English physician, 1789-1858. He was the first to investigate and make known its character. See DISEASE.

Brighton, brī'ton, a seacoast town fifty miles due south of London. It has a massive sea wall, a fine drive, and numerous hotels. It is a favorite watering place for London society. Queen Victoria owned a residence here until 1841. The population in 1921 was 142,427.

Brilliantine, a dress fabric woven with cotton warp and mohair weft. It is of plain weave, figured in the loom, or woven with two or more colors. Brilliantine is, in reality, another name for mohair. A similar material is Sicilian cloth, which is woven, however, with a heavy weft, producing a ribbed effect. All three of these fabrics have a lustrous surface, shed dust readily, and are durable. See ANGORA WOOL.

Brimstone. See SULPHUR.

Brisbane, brĭz'bane, a city of Australia and capital of Queensland. It is situated about twenty-five miles from the mouth of the Brisbane river, and is of considerable commercial importance. The channel of the river has been deepened so that large vessels can reach the city. Railways connect it with other cities of Australia. The city lies on both banks of the river, a fine iron bridge connecting the two parts. There are many notable buildings, including the Houses of Parliament, the post-office, and the buildings of a technical college. Population, 1921, 209,699.

Brisbane, Arthur (1864-), an American newspaper editor, was born at Buffalo, N. Y. He began his journalistic career in 1882 as a reporter on the New York *Sun*, later becoming London correspondent for this paper. He has been editor of the *Evening Sun* and managing editor of the New York *World*. Mr. Brisbane began his work with the Hearst papers in 1897, becoming editor of the New York *Evening Journal,* and serving in that capacity until 1921. Since early in his editorial career Mr. Brisbane has exercised a large influence on the popular mind in the United States.

Bristle, a stiff hair on a plant or animal. The stems of many plants are clothed with bristles that impede the advance of insects toward the flowers and tender parts. The Venus flytrap is surrounded by a row of bristles that serve to imprison the insect when the trap closes. The mouth of a flycatching bird is usually surrounded by a row of bristles that assist in catching insects, or, at least, in guiding the insect into the mouth.

Commercial bristles are obtained chiefly from the backs of hogs. The best are obtained from the gaunt hogs reared in the cold forests of Russia. North China markets 6,000,000 pounds a year. They fetch about 37½ cents a pound. The coolies assort the bristles into several lots of from 2½ to 6 inches in length, and tie them up in bunches about 2 inches in diameter.

Bristol, a city of England. It lies 118 miles due west from London. It is situated on the Avon, seven miles from the Severn, at the head of tidewater navigation. Bristol is noted for its capacious docks. The tides rise to the extraordinary height of forty feet, the greatest in Europe. The city has long had an extensive commerce with all parts of the world. Large coal mines are found near by. Glassware, pottery, and soap are manufactured in large quantities and exported to the British colonies. The total foreign business of the year is valued at about $65,000,000. There are large shipbuilding interests. The Great Western, the first steamship to make regular voyages across the Atlantic, was built here. Sebastian Cabot was born at Bristol. In his day Bristol was the chief seaport of Great Britain. Bristol ships visited the Newfoundland seal fisheries each year long before any European settlements were made in North America, and, indeed, Bristol merchants had been interested in explorations in the Atlantic before Columbus. The city and its business are growing rapidly. The population in 1921 was 377,061. See ENGLAND.

BRITISH COLUMBIA

British Columbia is the most westerly province of the Dominion of Canada. Because so large a part of it is mountainous, it is sometimes called the Switzerland of America. It has many pleasant and fertile valleys, and its northeast corner belongs to the interior lowland region which slopes northeastward to Hudson Bay and the Arctic regions. More than ninety per cent of its area, however, is included in the great mountain mass called the Cordilleran system, the backbone of the American continent.

British Columbia has an area of 355,855 square miles, making it the third in size among the Canadian provinces. It is about five times as large as the state of Washington, which adjoins it on the south. From north to south it extends 740 miles, and from east to west, at its greatest breadth, 640 miles. So large a part of the province is mountainous that the population averages a little less than two per square mile. The population has increased very rapidly, jumping from 36,000 in 1871, at the first Dominion census, to 98,175 in 1891, to 392,480 in 1911, and to 524,582 in 1921. This total is almost evenly divided between rural and urban, but the males outnumber the females by a ratio of five to three. People of English birth or descent are the largest element in the province, being roughly one-third of the population; the Scotch are second with about one-fifth, and the Irish have about one-tenth. Especially since 1900 there has been a marked increase in the number of immigrants from the United States, and these now form an important element. There are about 20,000 Chinese, 10,000 Japanese, and 25,000 native Indians. Most of the Indians live on reservations, where they have land set aside for them. They are not required, however, to remain on the reservations, but they may not sell their land without the government's approval.

Surface Features. The Cordilleran system is a vast mountain mass, from 350 to 450 miles wide, extending in a general direction from northwest to southeast. There are two principal ranges, the Rocky Mountains and the Coast Range, between which lies an elevated region called the Central Plateau or the Great Basin. Some geographers consider Vancouver and the other islands along the coast as a third range.

In the northern half of the province the Rocky Mountains lie wholly within British Columbia, but from latitude 54° N. southward to the American boundary they are divided between British Columbia and Alberta, the crest of the main chain forming the boundary between the two provinces. At the north the provincial boundary practically coincides with the end of the Rockies as a distinct chain. The average altitude varies from 5,000 feet in the north to 10,000 feet in the south. Mount Robson, the highest peak, rises 13,068 feet above the sea. Crossing the Rockies transversely are the Peace River valley and numerous smaller, relatively low gaps, including Kicking Horse Pass, followed by the Canadian Pacific Railway, Crow's Nest Pass, crossed by a branch of the same road, and Yellowhead Pass, farther north, crossed by the Grand Trunk Pacific. In addition to the Rocky Mountains proper, there are three other ranges, the Selkirk, Purcell and Gold, which belong to the Rocky Mountain system.

The Coast Range is a great wall, shutting off the interior of the province from the Pacific. On its sea side the range is deeply indented by countless fiords, caused by the partial submergence of the mountains. If this coast line could be straightened out into a continuous line it would reach from Vancouver to Yokohama and back again as far as Honolulu. The peaks of this range average about 7,500 feet in altitude. The partially submerged Island Range was once the westernmost division of the Cordillera, but now rises above the water's surface only in Vancouver Island and the Queen Charlotte group.

Between the Coast Range and the Rocky Mountains lies the great Central Plateau, broken by a number of smaller mountain ranges and deeply eroded river valleys, the largest of the latter being the Fraser. Another feature of this region is the large number of lakes.

The Influence of the Mountains. The mountains have had a profound in-

fluence on the climate and on the plant and animal life, and therefore on the development of the province. The mountains create a series of longitudinal zones, between which there are great differences in climate, natural resources and industry. First on the west is the coast zone, with a climate not unlike that of western Europe. The prevailing winds are westerly, warm and laden with moisture absorbed in their passage across the ocean. As the winds strike the heights of the Coast Range, condensation takes place rapidly, resulting in heavy rain and snow fall. The average precipitation is about 85 inches a year. Victoria is farther north than the city of Quebec, which is famous for cold winters, but in Victoria flowers often bloom in the gardens the year round.

Having lost a part of their moisture, the prevailing winds rise across the Coast Range, and blow across the Central Plateau at an elevation of 8,000 or 9,000 feet, without interference of any kind. Therefore the interior, instead of a temperate climate, with abundant rainfall, has a climate with sudden shifts, sharp extremes, and almost no snow or rain. At Kamloops, which is perhaps 200 miles as the crow flies from Victoria, the annual precipitation is about ten to twelve inches, and the temperature ranges from 25 to 30 degrees below zero to 100 degrees above. But in the Rocky Mountains the conditions of the Coast Range are almost duplicated, particularly on the western slopes. Wherever there is heavy rainfall, there is abundant vegetation, from mosses to giant trees. The western slopes of these ranges have probably the greatest areas of virgin timber in North America, covering an estimated area of over 30,000,000 acres. The Douglas fir is the most abundant and commercially most valuable of the forest trees, followed by white and yellow cedar. There are also great stands of spruce and hemlock, especially valuable for wood pulp. British Columbia each year produces about $5,000,000 worth of pulp. The various climatic zones also show marked differences in animal life. In the valleys and wooded parts are moose, caribou and black-tailed deer, while in the mountains are the big horn and the mountain goat. Bears and wolves are still so common in some sections that they are considered a pest. In the north are many fur-bearing animals, and birds are numerous almost everywhere. Jays and magpies are abundant, and the burrowing owl is characteristic of the interior plateau. Among the game birds are grouse, partridge, teal, mallard and canvasback. Trout and other fish are plentiful in the lakes and streams.

Mining, the Chief Industry. It was the mineral wealth hidden in the vast mountain masses that first called the world's attention to British Columbia, and mining is still the premier industry of the province. Placer mining for gold was carried on along the Fraser River as early as 1857 and 1858, and reached its maximum yield about five years later. The production of placer gold has long been of minor importance, but lode gold, with an average yearly output of $5,000,000, forms 15 to 20 per cent of the total mineral production of the province. Copper is by far the most valuable single mineral (about $18,000,000 a year), while the value of the annual production of silver, lead and zinc equals that of gold. Vast beds of coal of high grade exist in the Rocky Mountains and on Vancouver Island, and coal is second only to copper in the value of annual output (about $10,000,000 a year).

Fisheries. In the value of its mineral output British Columbia is a second, and not a very close one, to Ontario, but in the value of its fisheries it far outranks its rival provinces, contributing about 40 per cent of the total for Canada each year. Of the total of $20,000,000, roughly one-half is represented by the salmon catch. Seventy-five per cent of the salmon catch is canned; the Fraser River fisheries yield nearly two-thirds of this catch, while the Skeena River and Rivers Inlet contribute the bulk of the remainder. The spring salmon, or quinnat, is the largest variety, and is best when eaten fresh; for canning, the sockeye, which is smaller but of more uniform size, is preferred. Halibut is also commercially of consequence; less important fish are cod, herring, sturgeon, shad and clams.

Agriculture. British Columbia is not all water and mountains. Large sections

of it, particularly the valleys of the interior, are of high fertility, and require only irrigation to make farming profitable. In the Okanagan, Thompson and Columbia valleys are at least several hundred thousand acres tributary or still available to irrigation systems. Wheat is raised only in small quantities, but oats average 3,000,000 bushels a year. Apples, pears, plums and numerous small fruits, including strawberries, are successfully raised in the rich river deltas and valleys.

MANUFACTURES. The forests, mines and fisheries furnish the raw materials for British Columbia's manufacturing industries. Log and lumber products comprise almost one-fourth of the total, with smelted ores only a little way behind. Canned fish comprise one-tenth of the total. The center of the manufacturing industries is Vancouver, which alone produces between one-third and one-fourth of the total for the province.

TRADE, COMMERCE AND TRANSPORTATION. In the early days water transportation was much more important than it is now, for now British Columbia has 5,000 miles of railway. All three of the great Canadian transcontinental lines cross the province. In the Kootenay district steamers ascend the Fraser River as far as Yale, and in the interior lakes they furnish connections between many points not yet reached by the railroads. Most of the interior, however, is dependent upon highways and trails.

The ports of British Columbia are the natural outlets for Canadian trade with the Far East, and to a limited degree they also compete—especially Vancouver and Victoria—with ports in the United States for American trade. Vancouver is 400 miles nearer Japan than is San Francisco, and Prince Rupert, the terminus of the Grand Trunk Pacific, is 400 miles nearer Japan than any other large port in North America. The foreign commerce which clears through British Columbian ports is worth at least $150,000,000 a year, divided about 60 per cent imports and 40 per cent exports.

EDUCATION AND GOVERNMENT. Like all the other provinces of the Dominion, British Columbia has responsible government, the minsitry or executive council being responsible to the legislative assembly. The direct representative of the Crown is the lieutenant governor, who is appointed by the Federal Governor-General-in-Council of the Dominion for a five-year term. The executive council is composed of the minister of railways, attorney-general, provincial secretary, and the ministers of agriculture, labor, mines, education, lands and finance and the commissioner of fisheries. It is usual to combine several of these portfolios in the hands of one minister, so that the executive council rarely comprises more than eight or nine members, including the premier.

The executive council also acts as a council of public instruction, and the provincial secretary is usually the minister of education. The public school system is directly under his charge. School attendance is compulsory for children between the ages of seven and fourteen (with special exceptions). The schools are supported partly by the provincial government and partly by local taxation. Normal schools for teachers are at Vancouver and Victoria, and high schools, sometimes called superior schools, may be formed in connection with the primary schools whenever there are ten or more pupils qualified. The University of British Columbia, chartered in 1912, is at the head of the educational system.

The only court in the province having full criminal and civil jurisdiction is the provincial supreme court, composed of the chief justice and five associates, called puisne judges. From this court decisions may be appealed to the Federal Supreme court at Ottawa, with its own chief justice and four puisne judges, and in rare cases, a further appeal is possible to the Judicial Committee of the British Privy Council. Minor cases are heard in the first instance by police magistrates or county judges.

HISTORY. Various Spanish explorers, coming north from Mexico, are thought to have been the first white men to see the coast of British Columbia. In 1778, four years later, Captain James Cook explored part of the coast, and in 1788 the English made their first settlement at Nootka, but the Spaniards almost immediately drove

them out, supporting their action by the plea of previous discovery. For a time it seemed that war might result, but in 1793 the territory was divided between the two countries, Spain taking all land south of Nootka Sound, (including the present states of Washington and Oregon), England taking the remainder as far north as the Russian possessions.

Even while the territory was in dispute, English explorers had been at work. Among them were Captain George Vancouver, who surveyed the coast in 1792-1794, and Sir Alexander Mackenzie, who made his first overland trip to the coast in 1793. After the settlement of the dispute with the Spainards, British Columbia was the property of the great fur-trading companies, until 1821 of the Northwest Company, and thereafter, until 1866, of the Hudson's Bay Company.

In 1846 the action of the Company in building a fort at Victoria created great excitement in the United States, which claimed all the land to the line of 54° 40′. (See OREGON). During this period the Northwest was steadily growing in population, and the one-man government of the Hudson's Bay Company gradually became unsuited to the changing conditions. Vancouver Island was transferred to the Crown in 1859, and the mainland colony, originally named New Caledonia, was transferred to the Crown in 1866. Five years later British Columbia became one of the provinces of the Dominion of Canada.

The adherence of British Columbia to the Dominion was not secured without a struggle, severe though peaceable, and more than once, when it seemed that the government could not make good on its promise to build a railroad connecting the province with eastern Canada, the province threatened to secede from the Dominion. With the completion of the railroad, however, the agitation for separation ceased.

It is not unfair to say that the autocratic nature of the Hudson's Bay Company's regime left its mark on the government of British Columbia until the beginning of the twentieth century, but since 1903 responsible government has been unquestioned both in theory and practice. The first premier under the new regime was Sir Richard McBride, who held office for twelve years. His administration was marked by occasional labor troubles, by agitation against Japanese and Chinese immigration, and by the opening of the World War, which greatly stimulated mining, shipbuilding and other local industries. McBride's policy of aid to the railways, although at first overwhelmingly supported by the voters, was one of the causes which contributed to the overthrow of the Conservative cabinet of his successor, William J. Bowser, who took the premiership when McBride became provincial commissioner to England. A Liberal government headed by H. C. Brewster succeeded Bowser in 1916, and in the next year the cabinet was reorganized by John Oliver, who became premier and minister of railways. (The Oliver government was still in power in 1923). Prohibition and woman suffrage were adopted by popular vote in 1916.

British Empire, that part of the world which acknowledges the authority of the British Sovereign Power. It is in many respects the greatest empire the earth has ever seen. One-fourth of the entire area of the globe belongs to it; and 455,565,472 people in all grand divisions are under the protection of its flag. A telegraph cable encircles the globe, touching only British territory. Space will not permit an entry of the names of all the possessions, but the chief divisions may be stated as follows:

1. THE UNITED KINGDOM: England and Wales, Scotland, Ireland, the Isle of Man, and the Channel Islands.

2. EUROPEAN POSSESSIONS: Gibraltar and Malta.

3. ASIATIC POSSESSIONS: Aden, British North Borneo, Ceylon, Cyprus, Hong Kong, India and dependencies, The Straits Settlements, Federated Malay States and Weihaiwei.

4. AFRICAN POSSESSIONS: Union of South Africa, Southwest Africa; Bechuanaland Protectorate; Basutoland; Rhodesia; Nyassaland; Tanganyika Territory; Kenya; Uganda; Zanzibar; Egypt and the Sudan; British Somaliland; Nigeria; Gold Coast, Sierra Leone.

5. AMERICA. Bermudas, Canada, Falkland, British Guiana, Honduras, Newfoundland, Labrador, West Indies, including the Bahamas, Barbados, Jamaica, Leeward Islands, Trinidad, and Windwards.

6. AUSTRALASIA: Australia, British New Guinea, New Zealand, and numerous islands and islets in Oceania.

7. MANDATES. Mesopotamia, Palestine, Nauru Island, parts of Togo, Cameroon, Tanganyika Territory, Southwest Africa (held by the Union of South Africa), German New Guinea and adjacent islands (held by Commonwealth of Australia), German Samoa and adjacent islands (held by New Zealand).

The government of the empire is elastic and has been many centuries in the making. In early days the power was held by the kings, and today the shadow of those bygone days is reflected in the legal fiction which says that all acts of the government, whether they be executive, legislative or judicial, be taken in the name of the sovereign. In fact, however, Great Britain is a strictly limited monarchy, and the real executive is the cabinet, which is in effect a committee of the House of Parliament.

In the colonies and self-governing dominions the scheme of government parallels that of the United Kingdom. The crown, that is to say the king or his responsible ministers, appoints for each colony the chief executive officer, variously known as the governor or governor-general, or by some other name. His authority varies greatly. In Ireland and in the self-governing dominions, it is somewhat shadowy, much like that of the king himself at home, and dependent to a considerable degree on the character of the man in office. In Canada and Australia, for example, the governor-general is as unlikely to veto legislation as is the king himself, although constitutionally he is empowered to do so.

In legislative matters the law-making bodies of the dominions and the colonies have considerable freedom. None of the colonies is taxed by the British government, all taxes being levied by the local government, and in some cases the legislatures have even levied import duties on goods coming from the mother country. The right of the self-governing dominions in relation to foreign powers, especially since the World War, constitutes a vexed question, nor are the constitutional experts agreed on their status.

Commercial treaties have been negotiated, but even there the Dominion Commissioners signed as His Majesty's Commissioners. The Treaty of Versailles in 1919 was signed by representatives of each of the self-governing dominions. The whole matter is in a state of flux; but technically the status quo is that declaration of war and peace, and all treaty-making powers still rest with the British Government at Westminster. (March, 1923.)

In judicial matters the procedure and organization of the courts have usually been prescribed by the home government, sometimes through formal legislation, as in the British North America Act of 1867, sometimes merely by direction of the Secretary of State for Colonial Affairs or of some other official. In criminal cases the decisions of the colonial or dominion courts are final, but other cases may be appealed from the colonial supreme court or court of appeals to the Judicial Committee of the Privy Council of Great Britain. This committee reports its findings, which are not subject to further appeal, to the king in council. Provision has been made for the representation of the dominions on this committee, so that it really forms a final court of the empire.

This change was one of the results of the World War.

The Dominions frankly demanded partnership in the Imperial Empire and a voice in the making of policies, in preserving peace and the declaration of war, and their demands were cheerfully granted.

Bringing the Dominions on this basis means transforming the structure of the British Empire. Instead of an Imperial State, holding extensive colonial possessions, it will become a League of Federated States firmly united under a central government, each State (Dominion) having full freedom to legislate concerning its own affairs and also a voice in shaping the policies for the Empire.

The extent of the British empire is well expressed by Daniel Webster:

A power which has dotted over the surface of the whole globe with her possessions and military posts, whose morning drum-beat, following the sun, and keeping company with the hours, circles the earth with one continuous and unbroken strain of the martial airs of England.

Rudyard Kipling puts the same thought in other words:

We 'ave 'eard o' the widow at Windsor,
It's safest to let 'er alone:
For 'er sentries we stand by the sea an' the land
Wherever the bugles are blown.

Take 'old o' the Wings o' the Mornin'
An' flop round the earth till you're dead;
But you won't get away from the tune that they play
To the bloomin' old rag over'ead.

British Museum, a national collection of science, literature and the arts. It is one of the attractive features of London. The present building occupies the site of the old Montague House mentioned in English literature. It is built in the form of a hollow square, with two-story galleries and a basement. The principal front, a block in length, faces Russell Street and is adorned with a colonnade of forty-four Ionic columns. The collections were begun with a gift of coins, antiquities, and books from Sir Hans Sloane in 1753. By act of Parliament a copy of every newspaper, book, pamphlet, or sheet of music copyrighted in the Empire is forwarded to the Museum. In 1857 it was found necessary to fill the interior of the square with a library building. A fine reading room in the center under a circular dome is within easy access of 2,500,000 printed volumes and many thousand priceless manuscripts. Desks are provided for 300 readers—altogether the greatest reading room in the world for scholars. Catalogs are at hand and attendants bring whatever is desired. New books are coming in at the rate of 60,000 a year. There are forty-three miles of shelves. The building cost nearly $4,000,000. The library is the greatest in the world. The most valuable single volume is a Mazarin Bible, the first book printed with movable type.

The entire contents of the Museum are arranged in eight departments in the care of a staff of 320 persons. The management is in the hands of forty-eight trustees, including the Archbishop of Canterbury, the lord chancellor, and the speaker of the House of Commons.

It is impossible to enumerate the contents of the galleries and cabinets. Volumes, not pages, are required to enter the names. The first editions, rare books, and the manuscript writings of such people as Luther, Newton, Galileo, Burke, Cromwell, Milton, Gustavus Adolphus, Mary, Queen of Scots, Napoleon, Byron, Franklin, Frederick the Great, and a thousand others fill many a cabinet. The Roman gallery, the Assyrian gallery, the Hellenic room, and the hall of Egyptian antiquities present an orderly but overwhelming array of coins, casts, busts, vases, statues, weapons and armor, winged lions in stone from Nineveh, Etruscan vases of unknown antiquity, mummies from the Egyptian pyramids, and Theban sculpture in granite, alabaster, and sandstone. The Rosetta Stone is here, as well as fragments of papyrus rolls from the Nile and specimens of the hieroglyphics of the priests and the cuneiform writing of Babylon. Not the least interesting are antiquities of the period when Roman legions and Roman civilization prevailed in England. There are enough unread inscriptions to keep scholars busy for a century.

The natural history collections, the most instructive in the world, have been removed to a special building in front of Kensington Gardens. Scholars and sightseers visit the old museum. School children go to the new museum of natural history to see the birds' nests, plants, and mounted animals.

Brittany, the northwestern peninsula of France. When the Anglo-Saxons overran England, a large migration of Britons took refuge across the English Channel in the French province of Armorica. It was known afterward from the name of these settlers as Brittany. It formed one of the large dukedoms of France, and was at times almost independent. The inhabitants of entire sections of the country, especially along the west coast, still speak the Breton language. It is closely akin to

the Welsh. The manners, dress, and folk lore of the people also indicate that they are British, not French. Of late education in the French language has been required in all schools. The Breton language and costumes will soon be of the past. See NORMANS.

Broad Arrow, a device not unlike the broad-winged point of an arrow. Since about 1700 it has been stamped or stenciled on the public goods, especially military stores, of Great Britain. It is a felony to remove the mark from government stores, and an offense against the law to be found in possession of property marked or branded with the broad arrow. It may be remembered that during the late war between Japan and Russia, Great Britain denied the right of Russia to search ships to detain military supplies marked with the broad arrow, or to question their destination. The corresponding brand in this country is U. S. A.

Broadcloth, a fine quality of smooth, lustrous woolen cloth. It is plain woven, fulled, slightly napped, and sheared close. The best broadcloth is that intended for men's wear. Men's broadcloth is black. The wool is dyed usually in the raw state, or fiber. After weaving, the cloth is fulled until the fiber-ends of warp and weft are felted. This makes raveling impossible and hemming unnecessary. In finishing, the broadcloth is wetted, steamed, calendered, and hot-pressed until it is smooth and glossy. Broadcloth designed for women's wear is made of high grade wool which, as in all broadcloth, is carded and not combed. After weaving, the cloth is fulled carefully. It is then napped, steamed, and plunged into cold water, dried, sheared, and brushed. This process of napping, steaming, etc., is repeated from three to six times, the object being to produce an even, nappy, lustrous surface. The alternate steaming and cold water plunge are said to "fasten the bloom," or preserve the luster. After finishing in this way, the cloth is dyed, sheared a second time, hot-pressed, rolled and put up for market. The finest grades of broadcloth are light in weight, pliable, smooth, and lustrous. The threads of the weave are invisible.

Broadway, the most notable street in the New World. It is a broad, busy thoroughfare, and is indeed the principal business street of New York City. Starting at Bowling Green, the southern tip of the island, it runs northerly and due north in a broken, straight line. It connects with an old post road up the Hudson. The name has been extended to this road as far as Albany.

Brobdingnag, or **Brobdignag,** a country which Gulliver visits in Swift's *Gulliver's Travels.* Brobdignag was famous for the enormous size of its inhabitants and of all objects in it. See GULLIVER'S TRAVELS.

Brocade, a silken fabric having a raised pattern usually of flowers or foliage, interwoven with gold and silver. The raised appearance is produced by throwing the warp or weft threads into relief in the process of weaving. At one time embroideries were called brocades. The invention of the Jacquard attachment to the ordinary loom made possible the production of fabrics showing raised figures, and gave rise to a distinction between embroidery and brocade or loom-figured goods. At present any fabric, whether of silk, wool, or cotton, having raised figures produced in the loom, is called brocade. See JACQUARD.

Broch, Brough, or **Burg,** round towers found in northern Scotland and in the Western Isles. The walls, built of dry stone without mortar, are from ten to twenty feet thick at the base. They rise in some instances to a height of fifty feet and inclose a circular plat of ground from twenty-five to fifty feet in diameter. The tower is entered by a single doorway large enough for a domestic animal. The lower part of the wall is occupied by chambers opening upon the inner court. Above the chambers, at a height of about ten feet from the ground, a horizontal gallery about a yard wide and high enough to permit a man to stand upright, runs completely around the tower. It is accessible by a single stairway. Windows from the gallery look out upon the court. If

the walls be high enough, a second or even a third gallery adds its circuit, with windows directly above those of the first. Many of these towers were built on rocky promontories, points of land extending into the water of a lake, or places of natural strength, not infrequently surrounding a well or spring of water. Stout doors in the main entrance, outer walls, and dry ditches render it very probable that these towers were constructed by the rude inhabitants as a place of refuge for themselves and their cattle. Unless taken by surprise before they could provision their stronghold, it is evident that a neighborhood could hold out behind these fireproof walls for an indefinite time against any ordinary attack.

Broché, bro-shā′. See CASHMERE SHAWL.

Brock, Sir Isaac (1769-1812), a British soldier, who made a noteworthy record in military affairs. He entered the army at the age of sixteen; five years later he was made lieutenant, served in the West Indies, Holland and elsewhere, was put at the head of the 49th Infantry, and in 1802 was sent to Canada where he suppressed a threatened mutiny. After three years he returned to England, but in 1806 was again in North America. He commanded the troops in upper Canada and became lieutenant-governor of that province. General Hull, governor of the territory of Michigan, opened the War of 1812 by invading Canada from Detroit. Brock defeated him and his entire army. For this Brock was knighted in the Order of the Bath, but three days later he was killed at Queenston while attacking a United States force gathered on the Niagara frontier. The House of Commons voted a sum amounting to about $7,500 for the erection of a monument at London in honor of General Brock. Another monument to him was erected at Queenston in 1842.

Brockton, a city of Massachusetts, the largest boot and shoe manufacturing center in the country. It is on the New York, New Haven & Hartford railroad, and is about twenty miles south of Boston. Other manufactures are shoe machinery, motorcycles, tools, furniture, and rubber goods. The population of Brockton in 1920 was 66,254.

Brodeur, Louis Philippe (1862-), a Canadian statesman and a justice of the Supreme Court of Canada since 1911, was born at Beloeil, Quebec, and educated at St. Hyacinthe College and at Laval University. Called to the bar in 1884, he was elected as a Liberal to the Canadian House of Commons in 1891, retaining his seat until appointed Speaker of the House in 1901. Mr. Brodeur became Minister of Internal Revenue in 1904 and Minister of Marine and Fisheries in 1906. In the latter capacity he was influential in improving navigation on the St. Lawrence River. In 1907 and 1911, he was a member of the Imperial Conferences at London, and was one of the two ministers who negotiated the Franco-Canadian Treaty in 1907. Mr. Brodeur represented Canada at the Imperial Defense Conference of 1909, and became head of the Canadian naval service in 1910.

Brocken. See HARTZ MOUNTAINS.

Bromine, a non-metallic element. It was obtained from sea water in 1826. At low temperatures it is a reddish-black liquid, but at 63° F. it is converted into a heavy red vapor. The liquid is about 4.5 times as heavy as water. It has a salty taste but no odor. Bromine is a caustic. It turns starch yellow. Like chlorine, bromine has bleaching properties. In medicine bromide of ammonium is administered for whooping cough and infantile convulsions. This bromide is considered useful in nervous diseases generally. Bromide of potassium is given for sleeplessness, epilepsy, hysteria, delirium tremens, and various swellings, tumors, and diseases of the skin. Overuse is followed by stupor, loss of speech, and of memory.

Bronchitis, bron-ki′tis, an inflammation of the mucous membrane lining the bronchial tubes. The membrane may become inflamed and swollen to such an extent as to interfere with breathing. Bronchitis is most likely to attack tenderly reared children, old people, and those whose occupations require long hours in rooms filled with gas or flying dust. The symptoms are those of a severe cold. As reme-

dies a mustard plaster, a hot foot bath, and a glass of hot lemonade may be recommended. A Turkish bath is excellent. In severe cases physicians prescribe ipecac and seneca root.

Bronco. See MUSTANG.

Brontë, brŏn'te, **Charlotte** (1816-1855), an English writer. She was one of three sisters, daughters of an English clergyman, and was for a time a governess in Brussels. She wrote four books, *The Professor, Jane Eyre, Shirley,* and *Villette*. *Jane Eyre* is celebrated; the rest are forgotten or are of interest simply because they were written by the author of *Jane Eyre*. It is said that any writer can produce one successful novel, but that only a genius has material for more than one. It is a small collection of fiction that cannot afford a place for *Jane Eyre*. Miss Brontë was married in 1854 to the Rev. A. B. Nichols, her father's curate.

Bronze, an alloy of copper. The name is related to *brown*. Copper forms from seventy to ninety per cent of the alloy. Other metals entering in are tin and zinc. Bronze used for bells contains as high as twenty-five per cent of tin. The bronze used formerly for cannon contained about ten per cent of tin and a small amount of zinc. The bronze used in making statuary varies greatly in composition. Some statues are made of brass almost pure. Others contain from one to twenty-five per cent of tin, zinc, or sometimes lead. Bronze has been improved by the addition of a fraction of one per cent of phosphorus. An alloy of copper and aluminum, called aluminum bronze, has great tensile strength. Bronze was known to the ancients. In fact, the use of bronze preceded that of iron and steel, and gave the name to the so-called Bronze Age. For many purposes bronze is superior to iron. It is a tough metal not subject to rust. The ancients found it very satisfactory for swords, axes, and edged tools. This, before they were familiar with methods of making steel. See BRASS; BELL; ALLOY.

Bronze Age. See ARCHAEOLOGY.

Brook Farm, a New England socialistic community. It was organized in 1841 by George Ripley and his wife. Two hundred acres of land were purchased near West Roxbury, Massachusetts. Among those interested were Nathaniel Hawthorne, Amos B. Alcott, Charles A. Dana, Ralph W. Emerson, Theodore Parker, George W. Curtis, and Margaret Fuller. It was proposed to found a coöperative colony, or club, to farm, practice various kinds of handiwork, and to live simply and inexpensively. The members desired to be free from carking cares in order to have ample time for mental development. The plan worked seemingly well for a time. Surplus products were sold to outsiders. Educational work of all grades, from school to college, was undertaken. Outsiders were permitted to attend on payment of a small tuition. In 1843 the association came under the influence of certain ideas of Fourier. The interest of many members fell off in consequence. In 1846 the principal building was destroyed by fire, and in 1847 the organization broke up.

Brooklyn, one of the five boroughs of New York City. It occupies the western end of Long Island for ten miles solid. With the exception of several fragments, notably Prospect Park, the range of hills in which Washington sought to keep the force of Howe at bay has been graded, paved, and converted into a handsome residence section. Brooklyn was incorporated in 1801. In the course of growth it absorbed a full score of villages until it was the fourth city of the Union, but it was in turn consolidated with New York in 1898.

New York and Brooklyn are connected by suspension bridges, subways, railway tunnels and ferries. The New York and Brooklyn bridge, which spans the East River, connecting the boroughs of Brooklyn and Manhattan, has its New York terminal at the City Hall Park. This bridge was opened to traffic in 1883. It is the third largest suspension bridge in existence, and is one of the wonders of the world. Other large bridges are the Manhattan bridge, its Brooklyn terminal being Nassau street; the Williamsburg bridge, connecting Brooklyn with Grand street, Manhattan, is the largest suspension bridge in the world; it is 118 feet wide and car-

ries 4 trolley and 2 cable tracks, 2 roadways and 2 foot walks. The Queensboro bridge extends across the East river from East Fifty-ninth street, in New York, to Ravenswood, in the borough of Queens.

Few cities in the Union exceed Brooklyn in the total annual value of manufactures. The industries connected with sugar refining and the roasting of coffee are very important, while the large establishments engaged in making ropes, bagging, gloves, porcelain and many other industries give employment to a large number of persons.

There are many fine public buildings in Brooklyn, and the churches are many and represent various denominations. One of them is the famous Plymouth Church, the pulpit of which was occupied for forty years by Henry Ward Beecher; another being the Tabernacle, the church of De Witt Talmadge.

There are numerous points of interest in Brooklyn, such as Prospect Park, the location of the Soldiers' and Sailors' Memorial Arch, in memory of those who died in the Civil War; the bronze groups by MacMonnies, symbolizing the Army, the Navy, and the Chariot of Victory led by heralds of peace. South of the Plaza is the statue of General Warren. A monument of Prospect Hill marks Battle Pass, where fell 450 Maryland soldiers, defending the American retreat after the battle of Long Island. The Park has memorials of John Howard Payne, author of *Home, Sweet Home;* Irving, Lincoln, Moore, Mozart, and James S. T. Stranahan, an honored citizen, to whom Brooklyn largely owes its beautiful pleasure ground. Other features of Brooklyn are the Ocean Parkway, a fine boulevard which extends five and one-half miles to Coney Island; the Brooklyn Navy Yard, where thousands of Americans perished in the British prison ships of the Revolution. A memorial by MacMonnies marks the tomb of a number of them. Pratt Institute, a school of Science and Art, founded by Charles Pratt, is in Ryerson street. There are many hospitals and well equipped libraries, and the public school system is a part of Greater New York.

Brooks, Phillips (1835-1893), an American clergyman. He was a native of Boston. His people were first Congregational, then became Unitarian, and landed finally in the Protestant Episcopal church. Young Brooks was educated at Harvard and then was sent to the Episcopal Theological Seminary at Alexandria, Virginia, where he qualified for the ministry. At Harvard he was at a center of abolition and Unitarian doctrines; at Alexandria, a center of slavery and Episcopal doctrine. In this way he learned to see more than one side of a question. During the Civil War he was a staunch supporter of the Union, yet held to his friendships with his old Southern classmates at the seminary.

From the charge of a church in Philadelphia he was called to the rectorship of the Trinity Church of Boston, which he held from 1869 until elected bishop of Massachusetts. Aside from the powerful influence of his sermons on the private lives of his hearers, Bishop Brooks stood for the removal of sectarian prejudices. He objected to his own people's using the term "The Church," as though there were but one. He fellowed with the New England clergy and broke down much of the Puritan prejudice that existed against Episcopacy.

He was respected at home and abroad. Visiting England, he was invited to preach before the queen. He delivered a series of sermons in Westminster Abbey less than a year before his death.

Patience and strength are what we need; an earnest use of what we have now; and all the time an earnest discontent until we come to what we ought to be.

The care of the body and the care of the soul are not two duties, but two parts of one duty.

Broom, a well known household implement. The name belongs first of all to various shrubs of the pea family. They have long, pliant, willow-like branches. The common Scotch or Irish broom is about twenty feet high, with a wealth of erect, slender branches and large yellow locust-like flowers appearing in early summer. The twigs were much used in the making of coarse household and stable

brushes or besoms, just as bundles of willows, hazels, or other twigs were used for similar purposes in our colonial days. Through the use of this particular plant for sweeping, the old name of besom fell out of use in favor of broom. In America a very excellent besom, or broom, as it came to be called, was made from a suitable length of a hickory sapling. The upper part was shaved down to form a handle. The lower end, usually a tough butt, about four inches in diameter, was divided or shredded into fine splints, making a heavy, but exceedingly durable and effective broom for coarse work. A turkey wing was used for lighter work. The broom now in common use is made from broom-corn, a variety of sorghum. The "tops," or slender, tough, seed-bearing panicles, proved to be an excellent material for carpet brooms and whisk brushes, and came into general favor for that purpose about 1850. The last United States census reported 1,526 broom factories with a capital of $9,616,780, and an annual output valued at $18,490,847. Many protests have been made by these manufacturers against the making of brooms in penitentiaries, but as the broom makers have formed large combinations or trusts their complaints now have a less just foundation.

Broom-Corn, a remarkable grass belonging to the same species as sorghum, kafir corn, and durra. The stalk is succulent, but it lacks the sweetness of sorghum. The seeds are borne at the top of the stalk in panicles having long, straight branches. The tops or "brush" are used in broom-making, whence the name. Broom-corn is of two types, the dwarf and the standard. The dwarf grows from four to six feet high. The brush is used for whisk brooms and other small brooms. The standard type grows to twice the height of a man's head; the brush is from eighteen to thirty inches long, and is used for carpet brooms.

Broom-corn is considered a native of the warmer parts of the Old World. The seed weighs fifty pounds to the bushel. About two quarts are required per acre. Broom-corn requires much the same growing conditions as corn, though it is able to withstand a greater degree of drought. The plant makes growth anywhere in the corn belt, but the harvest season requires dry weather as the brush is discolored by rain. The brush is cut off at maturity. The seeds are scraped off by hand, or are removed by a broom-corn thresher. The tops are sorted and are cured under cover to retain their bright, greenish color. After drying, the brush is put up in bales weighing from 300 to 400 pounds. The yield varies from a bale to two bales an acre. The price runs from $50 a ton to three times that sum. Broom-corn is a money crop in the region extending from central Illinois to the Panhandle of Texas. Illinois farmers ordinarily raise the standard brush; Oklahoma and Kansas, having a drier climate, produce the dwarf brush. The American crop for 1921 was as follows:

State	Tons
Oklahoma	19,200
Illinois	4,400
Texas	3,900
New Mexico	2,600
Colorado	2,400
Kansas	1,700
Missouri	900
Total	35,100

Brother Jonathan. See CONNECTICUT.

Brougham, brōō'am or brōōm, **Henry, Lord** (1778-1868), a British statesman, orator and man of letters. He was a native of Edinburgh, was called to the English bar, entered Parliament and worked with the Liberals for various reforms, becoming a leader in debate. In 1820 he won public favor by his fearless and eloquent defense of Queen Caroline against George IV. He received a peerage, and in the ministry of Earl Grey, became Lord High Chancellor of England. Lord Brougham wrote on many subjects, being widely interested in science and literature. He was instrumental in founding the University of London in 1825, and two years later helped to establish the "Society for the Diffusion of Useful Knowledge," an organization which had immense influence in the matter of popular literature. So brief a sketch can give no adequate conception of the career

of this remarkable man. In literature he produced nothing lasting and where his influence had been most felt he was well nigh forgotten when he had once passed from the scene. We must, therefore, conclude that he lacked something of true greatness. Nevertheless, Lord Brougham's ability and energy, his talent, perhaps even his eccentricities, made him a wonderful man. It has been said that from 1820 to 1840 "no Englishman in any civil career played so important a part in public affairs or enjoyed so wide a fame as Henry Brougham." He was gifted with a phenomenal memory and with a command of language almost boundless. His vigor and energy seemed inexhaustible. Although tall, bony and loose-jointed with harsh features and fiery temper, which he did not always restrain, he was able with utter fearlessness and with perfect control over every power to use his advantages and disadvantages alike, to attain the ends for which he labored. And the ends were noble. "Of every human right Brougham was a champion; of every human wrong an avenger." The following quotation is from one of Lord Brougham's speeches. The subject was "Law Reform" and the speech, delivered before the House of Lords, lasted six hours:

"It was the boast of Augustus, and it formed a part of the glory in which his early perfidies were lost, that he found Rome of brick and left it of marble,—a praise not unworthy of a great prince, and to which the present reign also has its claims. But how much nobler will be the sovereign's boast when he shall have it to say that he found law dear and left it cheap; found a sealed book, left it a living letter; found it the patrimony of the rich, left it the inheritance of the poor; found it the two-edged sword of craft and oppression, left it the staff of honesty and the shield of innocence!"

Brown, Alice (1857-), an American novelist and writer of short stories. She was born in New Hampshire, and many of her stories are descriptive of New England life and character. She taught school for some years but gave up teaching to devote her time to literary work. Her writings show insight into character, carefulness in style, and finish. She is specially successful in the short story. *Meadow Grass* is a collection of some of the best of these tales. Among other writings are *The Road to Castalay, Fools of Nature,* and *Margaret Warrener.*

Brown, Elmer Ellsworth (1861-), an American educator. He was born in Kiantone, New York. He received his education at the Illinois State Normal University and the University of Michigan, studying later at German universities, and receiving the degree of Doctor of Philosophy at Halle. After teaching in various public schools he became assistant professor of pedagogy at the University of California and later the head of the department. In 1906 he was appointed commissioner of education for the United States. He resigned in 1911 to accept the chancellorship of New York University. A number of works on education are from his pen.

Brown, John (1800-1859), a noted abolitionist. Born at Torrington, Connecticut of Puritan ancestors. His sixth ancestor, Peter Brown, came over in the Mayflower. In 1805 the Browns moved to Ohio and settled in a wild country, where John grew up fond of a rifle and the woods. During the War of 1812 John's father had a contract to supply the government with beef; and John, then a lad of a dozen years, took a drove of cattle a hundred miles through the wilderness alone.

He came up barefooted and bareheaded, with a liking for Indian ways, woo lore, and cattle, but with a distaste f school. He scarce mastered the four operations in arithmetic, and had no knowledge whatever of grammar; but he was fond of reading history, and had an intimate acquaintance with the Scriptures. Passing by the idea of preaching he took, like Lincoln, to the practice of surveying. In his expeditions around the head waters of the Ohio he became acquainted with the Harper's Ferry region and developed a quickness of eye and ear and a knowledge of woodcraft that made him an expert border fighter later on.

In business matters John Brown seemed unable to stick to any calling long enough to make money. From surveying he tried his hand as a lumber dealer, postmaster, wool grower, farmer, wool merchant, fruit

grower, stock fancier, and land speculator, but failed in all. His mind was evidently on something else.

During his business experience he visited England with a disastrous shipment of wool; but his losses on wool, amounting to financial ruin, seemed to have made little impression. He spent his time studying military affairs and plans of fortifications, even crossing over to Germany and France for that purpose. He visited prominent English abolitionists and solicited financial aid, saying that he held himself destined to take up arms against slavery. About this time Mr. Gerrit Smith, a wealthy land owner, offered a large tract of land in the Adirondack region of New York to make free homes for runaway slaves. Brown removed his family to North Elba in this new country and undertook to receive the colored people, to settle them in cabins, and to teach them the rudiments of northern farming. North Elba thus became a well known terminal of the so-called "underground railway."

In 1854 Congress passed the Kansas-Nebraska act leaving it to the settlers of Kansas to decide whether that territory should come into the Union as a free or a slave state. The citizens of Missouri and adjacent slave-holding states took steps to control elections and secure Kansas soil for slavery. The Abolitionists of the North, at that time extending from Maine to the Mississippi, organized colonization societies, and hurried in settlers to hold the territory for freedom. A bitter border war sprang up between the incoming "intruding, hymn-singing Yankees," with their dogs, cattle, rifles, and Bibles, and the determined resident men of Missouri. Midnight murders, harrying of stock, burning cabins, settlements in ruins, violence at the ballot-box, and even pitched battles were features of that unhappy time. John Brown and his six sons hastened to Kansas to engage in the "holy crusade for freedom." Captain Brown, also known as "Ossawattomie Brown," from his place of settlement, was in the thickest of the fray.

Towards the close of the struggle, Brown went East. Under cover of collecting money and gathering arms to carry on border warfare in Kansas, he embarked upon a long cherished plan—a vast project for freeing the country from slavery by exciting the slaves to revolt. In the spring of 1859 he established a depot of clothes, blankets, food, pistols, rifles, and ammunition at Chambersburg, Pennsylvania. Among other warlike supplies were a thousand nine-inch dirks to be fastened to poles, with which he purposed to arm the slaves. In June he rented an abandoned farm with several buildings, in the mountains, five miles from Harper's Ferry, and concealed a force of men in the barn lofts. During the daytime Brown and a friend or two were in sight, apparently interested in sheep-raising. At night Brown drilled his men or sent them to bring supplies to their hiding-place.

Sunday night, October 16, 1859, Brown and his associates, sixteen white men and five blacks, set out with a wagon load of extra weapons for Harper's Ferry. They cut telegraph wires, stationed guards on the bridges, seized the United States arsenal and a rifle factory, and took possession of the town. A midnight passenger train for Washington city was detained, with some resistance on the part of passengers who supposed train robbers were holding them up. A negro porter was shot dead. The train was finally allowed to proceed. Passengers threw notes from the windows as they traveled, and gave a general alarm. As morning came on the citizens were arrested as fast as they appeared on the streets until over sixty were shut up in the arsenal. In the meantime Brown sent messengers to arrest prominent country gentlemen in the vicinity, and to summon the slave population to rise in arms. But the effort was a flat failure. The slaves were worse scared than the white people, and the day passed with nothing accomplished. By nightfall Virginia militia men had closed in on the town. Brown's sentinels were shot down or driven into the armory where they made a stubborn defense. By Tuesday morning a company of United

States marines under command of Col. Robert E. Lee, afterward Gen. Lee, arrived at Harper's Ferry, battered in the armory door with a long ladder, and overpowered the survivors. Of Brown's force, ten were shot during the siege, five escaped to the mountains, the rest were put in prison and brought to speedy trial at Charleston, the county seat. Brown was found guilty of treason, and conspiring and advising with slaves and others to rebel, and murder in the first degree." December 2, 1859, he was hanged in the public square. His remains were delivered to Mrs. Brown who conveyed them to North Elba, their Adirondack home. Wendell Phillips spoke at the funeral.

Although the Civil War has well nigh obliterated the traces of Brown's raid, it is still too early to speak judicially of his faults or his merits. No other execution in this country has caused so much excitement. Mrs. Brown freely stated that her husband had planned the raid for twenty years. He had thought the slaves would flock to his standard prepared to fight. He designed to follow the Allegheny Mountains clear to South Carolina, keeping in touch with the North by a long line of forest fortifications held by Northern volunteers and escaped slaves. He underestimated the ability of the Virginians, and over-estimated the intelligence and courage of their bondmen. His plan never had a chance of success and yet the general alarm created by the unsuccessful attempt was one of the immediate causes of the withdrawal of the Southern States from the Union. Few who carelessly sing,

John Brown's body lies mouldering in the grave,
But his soul goes marching on,

can now realize the intense detestation and equally intense enthusiasm once awakened by these words.

No doubt Brown had secret support, yet few openly approved his methods. In the South he was execrated, yet men were not wanting who did him full justice.

Brown, George (1818-1880), a Canadian journalist and statesman, was born at Edinburgh, Scotland, and was there given high school and academy training. Mr. Brown came to New York with his parents in 1838, but in 1843 he removed to Toronto. In that city in 1844 he founded and became the first editor of the Toronto *Globe*. He became friendly with Baldwin, Lafontaine, and other Canadian statesmen, and in 1851 was elected to the Assembly of Canada. His paper was powerful in moulding public opinion, and as an advanced reformer, Mr. Brown contended mightily for representation proportionate to population, secularization of the clergy reserves, and for nonsectarian schools. He became Premier in 1858, but resigned in two days because of the refusal of the Governor-General to dissolve the Assembly and call a new general election. He sat in the Assembly until 1861, and again from 1863 to 1867. In 1873, he accepted nomination to the Dominion Senate, but refused other honors. Mr. Brown was a sturdy advocate of Confederation. His political life was lived during one of the stormiest periods of Canadian history, and because of his uncompromising nature and forthright expression he was much lauded and much opposed; but his political ability was acknowledged by all. In later years Brown had the satisfaction of knowing that the clergy reserves had been secularized, through his efforts.

Brown-Sequard, sā-kär′, **Charles Edward** (1818-1894), a Franco-American physician, noted for his treatment of nervous diseases. His father was an American sea captain from Philadelphia, his mother a French woman. He studied medicine in Paris. After gaining some distinction abroad he came to the United States, where he was appointed to the chair of physiology and pathology at Harvard. He was later connected with the Virginia Medical College, and in 1869 became professor of pathology in the School of Medicine at Paris. In 1873 he established a medical journal in New York and returning again to Paris became professor of medicine in the College of France. He published several professional works, lectures, and articles in medical journals. Among them are *Physiology and Pathology of the Nervous System* and *Lectures on Nervous Afflictions.*

Brown University, an educational institution located at Providence, Rhode Island. It was founded in 1764, at Warren, under the name of Rhode Island College. It was later removed to Providence, and in 1804 the name was changed in honor of Nicholas Brown who had bequeathed a large sum of money to the institution.

Brown University in non-sectarian, but is, and always has been, under the auspices of the Baptist demonination. It has extensive and well equipped buildings, including an observatory containing one of the most powerful telescopes in America. The Woman's College was added in 1897. The library contains 225,000 volumes. The faculty numbers over 100 and the enrollment approximates 1,700. The endowment exceeds $4,250,000.

Browne, Charles Farrar (pseudonym, Artemus Ward) (1834-1867), an American humorist. He was born at Waterford, Maine, and died at Southampton, England. He learned the printer's trade, working on *The Carpet Bag,* a Boston comic weekly. He set the type for many of Saxe's humorous poems, and for Shillaber's *Mrs. Partington's Gripsack.* It is possible that this atmosphere of humor acted as an inspiration, for he soon started out, with a grotesque *Panorama,* as a comic lecturer. Successful from the first, he became the "dear delight of lecture halls." His works, in book form—*Artemus Ward, his Book, Artemus Ward, his Travels among the Mormons, Artemus Ward, his Book of Goaks, Artemus Ward in London,*—all have lost that which made his lectures irresistible, the personality of the lecturer. His manner was solemn—so naturally and simply solemn—as to be in itself mirth-provoking. Combined with this was a wit capable of giving to the commonplace some sudden turn or twist that would reveal a surprisingly comic side. Some of the witticisms of Artemus Ward are still current:

Always live within your income, if you have to borrow money to do it.

An occasional joke improves a comic paper.

Brownie, a Scotch fairy. In Scotland belief was strong in the existence of benevolent fairies who helped people out by working in the night. Sometimes a troop of brownies would cut or thresh grain, churn, guard the flock, etc. A prosperous farm was reputed to be guarded by the brownies. Brownies were never to be seen or spoken to. Palmer Cox has taken up the idea admirably in his "Brownie" pictures. See FAIRY.

Browning, Elizabeth Barrett (1809-1861), an English poet. She was the daughter of Edward Moulton-Barrett, a wealthy merchant, resident at the foot of the Malvern Hills. Her father took great pains with her education, and she was fond of reading and study. She wrote verses before she was eight years old. When about seventeen she published a poem entitled *Essay on Mind,* which, in later years, she considered unworthy of a place in a complete edition of her writings. In 1832 she published a translation of *Prometheus Bound,* a work which she rewrote a dozen years later and greatly improved. Miss Barrett continued to write, publishing a poem occasionally in some magazine. In 1838 a volume appeared entitled *The Seraphim and Other Poems,* which received much praise and some censure from the critics.

About this time her health failed. She had always been delicate and now a warmer climate was recommended as her only escape from an affection of the lungs. Her brother Edward took her to Torquay, but his accidental drowning while there was so great a shock to her nervous system that she was utterly prostrated. For a number of years she lived in seclusion in her father's house, a confirmed invalid. In spite of her weakness and suffering she continued her literary work. In 1844 she published two volumes of poetry containing some of her most popular work. In one of these, *Lady Geraldine's Courtship,* she made complimentary allusion to the poet Browning. This led to an acquaintance between the two poets and to their marriage in 1846. Mr. Barrett was bitterly opposed to the marriage of any of his children. Miss Barrett, at this time a woman of mature years, naturally decided the question for herself. To her great sorrow a complete reconciliation with her

father was never effected. Mr. and Mrs. Browning went to Italy soon after their marriage and made their home in Florence until Mrs. Browning's death. Her *Sonnets from the Portuguese* were published soon after her marriage. They are a series of love letters written during her engagement and are considered the finest sonnets of the sort in the English language. Her health was feeble; but Browning, unlike too many poets, was assiduous and unremitting in his care of her. Their life together was a happy one. Mrs. Browning's death occurred before her husband had attained public recognition as a man of genius. In 1856 appeared *Aurora Leigh,* a novel in verse. It is autobiographical, not so far as the incidents of the story are concerned, but in the account of the development of the heroine's mind and character. In a way, it reminds one of Tennyson's *Princess.* It is Mrs. Browning's most ambitious attempt and ranks next to, but far below, the *Sonnets. The Cry of the Children* is an eloquent protest against the employment of little children in British factories,—the piling up of national wealth by child labor. *Lady Geraldine's Courtship* is perhaps her most popular poem.

Mrs. Browning's work is very uneven. She seems to have written on sudden inspiration and to have spent little time in polishing and perfecting her work. The inspirations, however, were sufficiently frequent and powerful to win for her the reputation she has ever since retained of the greatest woman poet who has written in the English language.

SAYINGS.

Knowledge by suffering entereth,
And life is perfected by death.

God answers sharp and sudden on some prayers,
And thrusts the thing we have prayed for in our face,
A gauntlet with a gift in 't.

But the child's sob in the silence curses deeper
Than the strong man in his wrath.

Poetry has been as serious a thing to me as life itself; and life has been a very serious thing. I never mistook pleasure for the final cause of poetry, nor leisure for the hour of the poet.

SAID OF MRS. BROWNING.

In fervor, melodiousness, and splendor of genius, Mrs. Browning stands first among women. —Bayne.

Her genius was more dramatic than idyllic, and lyric first of all.—Stedman.

No writer has exerted a better, gentler, happier influence.—Chambers.

The most eminent poet among women is Elizabeth Barrett Browning.—Shaw.

A woman—an inspired singer, if there ever was one—all fire and air, her song and soul alike devoted to liberty, aspiration and ethereal love.—Stedman.

She felt for all who are in any way crushed or bruised by the pressure of society.—*Britannica.*

Browning, Robert (1812-1889), an English poet. He was born May 7, 1812, at Camberwell, a suburb of London. His father was a clerk in the Bank of England, with a decided turn for books and writing. Robert was educated chiefly at home and in the University of London. His people were not in accord with the theological views of Oxford or Cambridge. He grew up with the idea that much in society is not right, owing, as he thought, to the prevalence of low ideals. He appears to have lived in an atmosphere of art and to have believed that true art would supply the ideals wanting, and that art is not art that does not uplift. He was associated with a number of writers having the same aim, that of overcoming the insincerity and selfishness of society. When Wordsworth, one of these friends, accepted the position of Poet Laureate in 1843, Browning felt deserted and wrote *The Lost Leader:*

Just for a handful of silver he left us,
Just for a riband to stick in his coat.

In 1846 Browning married Elizabeth Barrett. They went to Florence, Italy, to live, though they traveled back and forth frequently, attending to their publishing interests. Mrs. Browning writes of a delightful two days' visit from Tennyson, while all were in London for a few days.

Browning's first poems to attract attention were *Pauline,* published in 1833, and *Paracelsus* the year after. *Strafford, Sordello,* and *A Blot in the 'Scutcheon,* were produced for the London stage. *The*

Ring and the Book, Red-Cotton Night-Cap Country, Ferishtah's Fancies, and *Asolando* are other titles. Browning's works thus far mentioned are hard reading. He has a trick of omitting relatives and infinitive signs, and of jumping abruptly from one thought to another. His allusions are far beyond the knowledge of ordinary readers—many tax the information of the learned. The few who enjoy these poems claim that they make ordinary poetry seem flat and insipid. The harder the shell the sweeter the nut, they would perhaps say.

Fortunately, however, Browning has written a number of delightful lyrics quite suitable for young people. Among these easier poems are *The Pied Piper of Hamelin, How They Brought the Good News from Ghent to Aix, Rabbi Ben Ezra, Abt Vogler,* and *Hervè Riel.*

Mrs. Browning, to whom he was passionately attached, and who had been an invalid before and during their married life, died in 1861. Their only source of kindly difference during fifteen years of wedded happiness is said to have been Mrs. Browning's leanings toward spiritualism, for which he had no liking. Much of Browning's best work was done after her death. Tardy recognition came to him in 1867 through the conferring of honors by Oxford and Cambridge universities. At his death December 12, 1889, Browning's remains were brought home from Venice and interred in Westminster Abbey between Cowley and Chaucer.

The first quotation below is from *Pippa Passes* a delightful poem, the doctrine of which is that a lightsome heart makes the burdens of others lighter. Pippa, a little silk-winder enjoying a rare holiday —one day a year—seems by her gladsome heart to lift the world's burden a little, even by passing along the way:

The year's at the Spring;
The day's at the morn;
Morning's at seven;
The hill-side's dew pearled;
The lark's on the wing;
The snail's on the thorn;
God's in his heaven—
All's right with the world.

That low man seeks a little thing to do,
Sees it and does it:
This high man with a great thing to pursue,
Dies ere he knows it.
That low man goes on adding one to one,
His hundreds soon hit;
This high man aiming at a million
Misses an unit.

Then welcome each rebuff
That turns earth's smoothness rough,
Each sting that bids nor sit nor stand, but go!
Progress is
The law of life: man is not Man yet.

Ah, but a man's reach should exceed his grasp,
Or what's a heaven for?

I judge people by what they might be,—not are, nor will be.

I count life just a stuff
To try the soul's strength on.

SAID OF BROWNING.

By his contempt of beauty, or inability to surely express it, he fails of that union of art and spiritual power which always characterizes a poet "entirely great."

Since Chaucer was alive and hale
No man hath walked along our roads with step
So active, so inquiring eye, or tongue
So varied in discourse. —Landor.

The man who, more than any other, will make the literature of the nineteenth century speak to the centuries to come.—Wendell.

Brownstone, a reddish brown sandstone formerly popular for the fronts of expensive dwellings in New York City, below Central Park. Its popularity was of short duration, owing to its tendency to split into layers, under the action of frost.

Brown Tail Moth, a moth especially destructive to the foliage of orchard, shade and forest trees. It was accidentally imported from Europe about 1890. The wings and body are white except a brush of brown hair at the tip of the abdomen of the female. The eggs are laid the first three weeks of July and hatch in 15 or 20 days. The caterpillars feed on the outer coating of the leaves. They have a wavy line of white spots on each side of the back with red spots at each end. The barbed hair contains a poison which causes a rash if it comes in contact with the skin. The caterpillars weave thin cocoons in October, from which they emerge late in June. The cocoons should be destroyed during the winter. Spray infested trees with a solution of lead arsenate. See INSECTICIDES; GYPSY MOTH; SPRAYING.

Bruce, Robert (1274-1329), a noted king of Scotland. He is associated in the Scottish mind with the independence of Scotland. He is a grandson of the Robert Bruce who contested the Scottish throne with Baliol. His father, also of the same name, remained in England, and accompanied Edward I to Palestine rather than swear allegiance to the house of Baliol. The subject of this sketch cast his lot with Wallace in the fight for freedom from English domination and, after the death of that hero, became the national leader. He was assisted to this resolution by a quarrel between himself and John Comyn, called the Red Comyn, a nephew of Baliol. Bruce stabbed him in the church of Dumfries, March 27, 1306. Bruce was crowned king at Scone.

War with England followed. At times Bruce was so hard pursued by the English and the adherents of the Baliols, that he was obliged to take to the wildest mountains, woods, and caves. Then, as opportunity came, he would arouse a few followers, sally forth, and strike the English a blow and secrete himself again. Finally he gathered strength, took castle after castle, and in 1314 laid siege to the Castle of Stirling, the last stronghold held by the English. In the battle of Bannockburn, fought with an immense host of English marching to the relief of Stirling, 30,000 Englishmen it is claimed were slain. This is no doubt a gross exaggeration, but the defeat was a decisive one. The independence of the Scots was recognized finally by the English Parliament March 4, 1328. Bruce died suffering, it is said, of leprosy, June 7, 1329. His heart was embalmed and sent to be buried at Jerusalem, but Sir James Douglass entrusted with the mission was killed in a fight with the Moors in Spain. The heart was brought back and buried at Melrose. His body was buried at Dunfermline where in 1818 his bones were discovered.

See WALLACE; BANNOCKBURN.

Bruchesi, Louis Joseph Paul Napoleon (1855-), a Roman Catholic archbishop of Montreal. Of French-Canadian parentage, he was born in Montreal. He finished his education in France and in Rome, where he was ordained a priest in 1878. He was a priest for several years in Montreal, after which he became professor of Christian apologetics in Laval University. In 1897 he was appointed Archbishop of Montreal. He was much interested in the cause of temperance and a result was the founding of the Anti-Alcoholic League in 1907, and other movements for the betterment of social and industrial conditions. He also established an order of nurses known as the Sisters of Hope. In 1909 he became vice-president of the Dominion Forestry Association. He has always stood high in his church and has taken a prominent place in its councils.

Bruges, brū′jĕz, a city in the western extremity of Belgium, seven miles from the port of Ostend. In the fourteenth and fifteen centuries Bruges was the headquarters of the Hanseatic League, and was the busiest commercial city in the world. Its population was rated at 200,000. Its merchant princes vied with royalty. Twenty foreign ministers resided within its walls. The queen of Philip the Fair of France was received in such state that she declared, "There are a hundred here who have more the air of queens than myself." At the height of its prosperity it was the silk and wool and cloth market of the world. Over 50,000 weavers were employed. The Duke of Burgundy instituted the Order of the Golden Fleece in honor of the wool merchants. An unsuccessful insurrection against the Archduke Maximilian in 1488 resulted in harsh measures. Commerce was driven to the rival city of Antwerp; manufactures were driven to England, laying the foundation of the country's superiority in cloth and cutlery. Bruges still has manufactures of silk, linen, cotton, and woolen goods, lace, leather, soap, starch, beverages, bells, and pottery, but the population has fallen to about 50,000.

To one who likes to ponder amid the associations of the past, Bruges is a more interesting city than Brussels. The finest chimes in Europe hang in the town belfry.

In the market-place of Bruges stands the belfry old and brown.
Thrice consumed and thrice rebuilded, still it watches o'er the town.

The wood carvings of the court of justice and the town hall, darkened with age, are unsurpassed. Stained glass, paintings by the masters, towers, spires, and halls where fashion once held revel are on every side. Poets, historians, and thoughtful people find Bruges an interesting city. Longfellow climbed the belfry one morning ere the city was awake:

I beheld the pageants splendid that adorned those days of old;
Stately dames, like queens attended, knights who bore the Fleece of Gold.
Lombard and Venetian merchants with deep-laden argosies;
Ministers from twenty nations; more than royal pomp and ease.

Wordsworth, too, walked about the old market, musing on the changes:

In Bruges town is many a street
Whence busy life hath fled,
Where, without hurry, noiseless feet
The grass-grown pavement tread.

See Belgium; Antwerp; Ghent.

Brummel, George Bryan (1778-1840), an English man of wealth and fashion, known to the world as "Beau Brummel." He was born in London. Becoming at the age of 16 an intimate companion of the Prince of Wales, afterward George IV, Brummel upheld for many years the reputation for exquisite dress and manners he had acquired at Eton and Oxford; and for a decade he set the standard of dress and etiquette for England's metropolis. Brummel received the sum of £30,000 at his father's death; but after he lost his royal friends he gambled recklessly, became poor, and finally fled to France to escape his creditors, dying in the Asylum du Bon Sauveur, pauperized and insane. From 1830 to 1832, he was British Consul at Caen, the city in which he died.

Brunelleschi, Filippo (1374-1446), the founder of Renaissance architecture, was born in Florence. He was first a goldsmith, next, a sculptor, and, later, an architect. He was a mathematician and an inventor, contriving many devices for raising building materials. Brunelleschi delighted in the construction of domes, and at one time he carried his ideas on the subject so far that he was considered insane. Nevertheless, he erected the dome of the Cathedral of Saint Mary, at Florence. It stands yet as a monument to his genius; and, though it is somewhat smaller than the dome of St. Peter's at Rome, the latter is inferior to it in lightness of structure and in grandeur of style.

Brunhild. See Nibelungen Lied.

Brunn, an Austrian city, capital of **Moravia**, now a part of Czechoslovakia, on the railway from Vienna to Prague, almost encircled by the rivers Schwarzawa and Zwittawa. It contains some fine old buildings, among them a cathedral and several churches. There is also a *landhaus* and several palaces.

Brunn has extensive manufactures of woolen. It is the center of Moravian commerce, much of which is carried on by fairs. Near the city is the fortress of Spielberg, in which Trenck and Silvio Pellico were confined. Population 1921, 221,422.

Bruno, brōō′no, **Filippo Giordano** (1548-1600), an Italian philosopher who was burned at Rome as a heretic. He was born at Nola, in the kingdom of Naples, and at an early age entered the order of Dominicans. He expressed doubt as to the doctrines of transubstantiation and the immaculate conception, and in consequence was forced to flee from the convent and later from Italy. He visited Paris, London, and several cities of Germany, lecturing and writing. While in England, under the protection of the French ambassador and enjoying the friendship of Sir Philip Sidney, he wrote his greatest works which are of a metaphysical character, *On the One First Cause* and *On the Infinity of the Universe and of Worlds.* Sixteen years after he left the convent he returned to Italy. In Venice he was arrested by order of the Inquisition and taken to Rome where he was imprisoned. For seven years every effort was made to induce him to recant, but in vain. He suffered death at the stake in the year 1600.

Brunswick, formerly a town of the German Empire. It is made up of eight distinct parts or districts. The most impor-

tant part, containing the cities of Brunswick, Wolfenbütel, and Helmstedt, is situated southeast of Hanover. Brunswick includes about 1,424 square miles of territory and has a population of about 485,900, more than a quarter of that number living in the city of Brunswick, the capital of the duchy. The Harz mountain system runs into the southeastern part of Brunswick. The northern part is undulating. Agriculture is the principal occupation of the people, who raise grain, tobacco, flax, and hops. Mining is also an important industry, deposits having been found of iron, copper, lead, and coal. There are manufactures of linen and woolen goods, leather, paper, and beet sugar.

Brunswick, Family of, a distinguished family founded by Albert Azo II, Marquis of Reggio and Modena, a descendant of Charlemagne. In 1047 he married Cunigunda, an heiress of the Counts of Altorf, thus uniting the houses of Este and Guelph. From his son, Guelph, descended Henry the Proud, who succeeded in 1125. Otho, the great-grandson of Henry, was the first who bore the title of Duke of Brunswick (1235). By the two sons of Ernest of Zell, who became Duke in 1532, the family was divided into the two branches of Brunswick-Wolfenbüttel (II) and Brunswick-Hanover, from the latter of which comes the present royal family of Great Britain. George Louis, son of Ernest Augustus and Sophia, granddaughter of James I of England, succeeded his father as Elector of Hanover in 1698, and became King of Great Britain in 1714, as George I.

Brunswick, Georgia, county seat of Glenn County, situated 8 miles from the Atlantic Ocean on Saint Simons Sound. It is 275 miles from Atlanta. Four railroads enter the city, and there are large docks and warehouses. The city contains several large hotels, a Federal building, a city hall and a $150,000 court house; also some large office buildings. It was settled as early as 1735 by James Oglethorpe, and became a city in 1856. Population, 14,413.

Brush, an implement composed of a solid back or base, in which are set hairs, bristles, fibers or wire. Brushes are used for a great variety of purposes, such as scrubbing, dusting, smoothing, polishing, and laying on of colors or coating a surface as with varnish or plaster. Brushes are made also in a great variety of shapes and sizes and of many different materials. They are sometimes classified as simple and compound. Simple brushes consist of but one tuft of hair or bristles. The smallest of these are the artists' pencils, as they are called—just a few soft hairs or bristles carefully arranged to form a point in the center of the tuft, which is then inserted in a suitable handle. A compound brush contains more than one, sometimes many tufts of bristles or fibers. These tufts are fastened in the back by means of wire, the wire being concealed by a piece of wood or other ornamental substance which is glued over it. There are in the United States some fifteen hundred establishments for the manufacture of brushes and brooms. The total value of the products is estimated at more than thirteen millions of dollars.

Brussels, the capital of Belgium. It has an inland position fifty miles from the North Sea. It is said to be a miniature edition of Paris. The old walls have been replaced by boulevards, five miles of which are planted with elm and linden trees in four rows, quite encircling the older part of the town. There are fourteen public squares. Sumptuous modern government buildings are disposed about a park of seventeen acres. The city hall, dating from 1401, with a spire 364 feet high, is a noble specimen of Gothic architecture. The Cathedral of St. Gudule was founded in 1010. It is celebrated for its sculpture and paintings, stained glass and pulpit. The presence of the court, a university, museum, art gallery, observatory, a public library of 350,000 volumes, a conservatory of music, a zoölogical and a botanical garden, and several learned societies, make the city a pleasant home for people of means and intelligence. Brussels has long been famous for lace, carpets, and jewelry. Some of the finest lace is valued at $40 a yard. It is a city of many factories, foundries, breweries, and machine shops. Coal and iron

are near at hand. The language spoken by the court is French. Many of the people speak Flemish. On August 20, 1914, the Germans took the city without a siege. Population, 1920, 684,870. See BELGIUM.

Brut, a poetical version of the legendary history of Great Britain by Layamon. This work is, in reality, a translation and enlargement of Wace's Norman French poem, *Brut*. Layamon's poem contains 32,000 lines. It was written about 1200, and gives in alliterative verse the history of Britain from the fall of Troy to the year 689. Brut, or Brutus, was supposed to have been the grandson of Ascanius. The story runs that he landed at Totniss in Devonshire, slew the Albion giants, and reigned as king in the island. At his death the kingdom was divided among his three sons. In the opening lines Layamon gives a brief account of himself and his purpose:

An preost wes on leoden,
Layamon wes ihoten.
He was Leouenathe's sone:
Lithe him beo drihte!
He wonede at Ernleye,
At aethelen are chirechen,
Uppon Seuarne stathe:
Sel thar him thuhte,
On fest Radestone,
Ther he bock radde.
Hit com him on mode
And on his mern thonke, etc.

Of the above original we give the following free translation:

A priest was in the land,
Layamon was he hight.
He was Leovenath's son:
Gracious to him be the Lord!
He dwelt at Earnley,
Where are noble churches,
On the Severn's bank:
Well there he thought,
Not far from Radestone,
Where he read books.
It came in mind to him,
And in his chief thought,
That he would of the English
The noble deeds tell:
What they were called,
And whence they came,
Who the English land
First possessed.

The first Englishman who attempts it (turning the Norman French chronicles into English), is Layamon, a monk of Ernely, still fettered in the old idiom, who sometimes happens to rhyme, sometimes fails, altogether barbarous and childish, unable to develop a continuous idea, babbling in little confused and incomplete phrases, after the fashion of the ancient Saxons.—Taine.

Brutus, Lucius Junius, a legendary Roman leader, about 500 B. C. Many stories are related of him. According to the first, he was sent with the two sons of King Tarquin to consult the oracle of Delphi in Greece. Their business done, the oracle was asked, "Which of us shall be king of Rome?" "He that kisses his mother first," was the ready reply. Accordingly when they landed, the two sons of the king sped away, each eager to salute the queen mother first; but Brutus, with more wit, pretended to stumble, and pressed his lips to mother earth. Tarquin, the king, having insulted Lucretia, the peerless wife of an honored citizen, Brutus joined a band of patriots to drive the Tarquins from power. This accomplished, a republic was declared, and he was elected first consul. When Brutus found that his two sons were engaged in a treasonable conspiracy to bring the Tarquins back, he gave orders that the lictors should proceed to do their duty just as though his boys were the sons of a man not in authority. They were accordingly put to death before their father left the Senate chamber. When at length the Tarquins marched upon Rome, Brutus led a body of Roman citizens. He and one of the sons, who in former days visited the oracle, met in personal combat; each plunged his sword into the other. Both fell. The Romans conquered the followers of Tarquin and gave Brutus a magnificent burial.

Brutus, Marcus Junius (85-42 B. C.), a noted Roman citizen. He was a nephew of Cato and a follower of Pompey. After Caesar had overthrown Pompey in the battle of Pharsalia, he received Brutus kindly and made him governor of Cisalpine Gaul, and later of Macedonia. None the less Brutus allowed himself to be drawn into the conspiracy described in Shakespeare's *Julius Caesar,* and even raised his hand to stab his benefactor. No wonder that Caesar, seeing him, cried out, "And you, too, Brutus!" After Antony had aroused the populace to fury, Brutus fled to his former government of Mace-

donia, placed himself at the head of the Roman legion in that province, and joined Cassius in Asia. They were beaten by the forces of Antony and Octavius. Brutus fell on the point of his sword and ended a life that should have turned out far otherwise. In Shakespeare's speech of Brutus to the citizens of Rome we have his own self justification:

If there be any in this assembly, any dear friend of Caesar's, to him I say that Brutus's love for Caesar was no less than his. If then that friend demand why Brutus rose against Caesar, this is my answer: Not that I lov'd Caesar less, but that I lov'd Rome more. Had you rather Caesar were living, and die all slaves, than that Caesar were dead, to live all free men? As Caesar lov'd me, I weep for him; as he was fortunate, I rejoice at it; as he was valiant, I honour him; but as he was ambitious, I slew him. There is tears for his love; joy for his fortune; honour for his valour; and death for his ambition.

See CAESAR.

Bryan, William Jennings, an American statesman and political leader. He was born at Salem, Illinois, March 19, 1860. He was graduated at Jacksonville, 1881, and at the Union College of Law, Chicago, 1883. After four years of practice at Jacksonville he removed to Lincoln, Nebraska. In 1890 he was elected to Congress where he served four years. On his retirement from Congress Mr. Bryan acted as editor of the Omaha *World-Herald*. He was a delegate to the Democratic National Convention at Chicago in 1896. He electrified the convention by an address in which he said:

"No, my friends, that will never be the verdict of our people. Therefore we care not upon what lines the battle is fought. If they say bimetalism is good, but we cannot have it until other nations help us, we reply, that instead of having a gold standard because England has, we will restore bimetalism, and then let England have bimetalism because the United States has it. If they dare to come out in the open field and defend the gold standard as a good thing, we will fight them to the uttermost. Having behind us the producing masses of this nation and the world supported by the commercial interests, the laboring interests and the toilers everywhere, we will answer their demand for a gold standard by saying to them: You shall not press down upon the brow of labor this crown of thorns. You shall not crucify mankind upon a cross of gold."

He was nominated for the presidency on a free silver platform and carried on a remarkable train-end and platform campaign. He was defeated by William McKinley. In 1900 he ran again, but was defeated by Mr. McKinley a second time. Mr. Bryan improved an interval of rest by taking a trip around the world. He wrote articles for a syndicate of newspapers and, on his return, he accepted extensive platform engagements. In 1908 Mr. Bryan ran for the presidency a third time, and was defeated by William Taft. In 1900 he established *The Commoner,* a political weekly devoted to the interests of the common people, as Mr. Bryan interprets those interests. In 1913, Mr. Bryan was appointed Secretary of State. In 1915, due to differences with the President regarding foreign policies, he resigned.

Bryant, William Cullen (1794-1878), an eminent American poet and journalist. He was born at Cummington, Massachusetts, November 3, 1794. He died in New York City, January 12, 1878. The standard life of Bryant is that in two volumes by Godwin. His father was a physician with decidedly literary tastes. His mother was a descendant of John Alden. The son was educated for the law, but did not practice. *Thanatopsis* was written in 1811 and was found in a pigeonhole of an old desk by the father, who was so overcome that he is said to have wept for very joy and pride. When later the editor of the *North American Review* asked Doctor Bryant for something written by his talented son, he sent the manuscript of this poem. It appeared in the September number for 1816. At first literary people refused to believe that any poem so able had been written on this side of the Atlantic, and accused the editor of having allowed himself to be imposed upon. Stoddard says that it is "the greatest poem ever written by so young a man." The success of this and other poems determined Bryant to be a writer. In 1825 he went to New York City, where he founded a paper, but abandoned it for an interest in the *Evening Post* with which he was connected in an editorial capacity during the rest of his life. Among his

more extensive works are translations of the *Iliad* and the *Odyssey*.

The lines, *To a Waterfowl,* were inspired by wild fowl seen winging their way against the sky as he neared a village where he proposed to practice law. No doubt he was weary and lonesome. A number of his poems are favorites with young people. The *Song of Marion's Men, Robert-of-Lincoln, The Fringed Gentian, The Death of the Flowers,* are of this class. Some of his sober pieces, *Thanatopsis* always first, are the *Inscription for the Entrance to a Wood* and *A Forest Hymn*.

His New York life at the age of seventy-seven is thus described by himself: "I rise early . . . about half-past five; in summer half an hour, or even an hour, earlier. Immediately, . . . I begin a series of exercises . . . These are performed with dumb-bells, . . . with a pole, and a light chair swung around my head. After a full hour . . . passed in this manner, I bathe from head to foot. . . . Animal food I never take at breakfast. Tea and coffee I never touch at any time. . . . After breakfast I occupy myself for a while with my studies; and when in town I walk down to the office of the *Evening Post,* nearly three miles distant, and after about three hours return, always walking whatever be the weather or the state of the streets. . . . In the country I dine early, . . . making my dinner mostly of vegetables."

Those who met Bryant considered him a cold, reserved, austere man. In old age he had a remarkably patriarchal appearance. Without a doubt he chafed for the woods and streams of his native state. The following lines from his *Green River* give a glimpse of this desire:

That fairy music I never hear,
Nor gaze on those waters so green and clear,
And mark them winding away from sight,
Darkened with shade or flashing with light,
While o'er them the vine to its thicket clings,
And the Zephyr stoops to freshen his wings,
But I wish that fate had left me free
To wander these quiet haunts with thee,
Till the eating cares of earth should depart,
And the peace of the scene pass into my heart;
And I envy thy stream, as it glides along
Through its beautiful banks in a trance of song.
Though forced to drudge for the dregs of men,
And scrawl strange words with the barbarous pen,
And mingle among the jostling crowd,
Where the sons of strife are subtle and loud—
I often come to this quiet place,
To breathe the airs that ruffle thy face,
And gaze upon thee in silent dream,
For in thy lonely and lovely stream
An image of that calm life appears
That won my heart in my greener years.

OTHER QUOTATIONS.

Go forth under the open sky, and list
To Nature's teachings.

All that tread
The globe are but a handful to the tribes
That slumber in its bosom.

The groves were God's first temples.

The melancholy days are come, the saddest of the year.

Truth crushed to earth shall rise again.

SAID OF BRYANT.

His poetry overflows with natural religion—with what Wordsworth calls "the religion of the woods."—Christopher North.

One remarked at once the exceeding gentleness of his manner, and a rare sweetness in the tone of his voice, as well as an extraordinary purity in his selection and pronunciation of English.—Parke Godwin.

We saw in his life the simple dignity which we associate with the old republics. So Lycurgus may have ruled in Sparta, so Cato may have walked in Rome—an uncrowned regality in that venerable head.—George William Curtis.

Bryn Mawr, a college for women at Bryn Mawr, Pennsylvania, near Philadelphia. It was founded in 1880 by Joseph W. Taylor, a Friend. The College has both an undergraduate and graduate department and awards the degrees of A.B., A.M. and Ph.D. There are over 60 instructors and about 500 students. The endowment exceeds $5,000,000.

Bryce, brīs, **James** (1838-1922), a British historian and statesman. He was born at Belfast. His father was a Glasgow schoolmaster held in high repute for his scientific attainments. Young Bryce was educated in the high school at Glasgow and in the university of that city. Later, he was graduated with honors at Trinity College, Oxford. For a time he turned his attention to law, residing in Lincoln's Inn, London. From 1870 until 1893 he was Regius Professor of civil law at Oxford. In 1880 he entered Parliament, identifying himself with the Liberal par-

ty and the principle of home rule for Ireland. He has written several historical works. He is known best in America as the author of *The Holy Roman Empire,* and particularly of *The American Commonwealth.* The latter is the best exposition of our system of popular government that has yet appeared. It is in fact a monumental work, intelligent, sympathetic, full of courage and plain speaking. In 1905 Mr. Bryce became a member of the British cabinet. In 1908 he was sent to Washington as an ambassador from the Court of St. James.

From 1880 to 1908 Mr. Bryce held important positions in the British government. In the latter year he was sent to the United States as Ambassador for Great Britain, which position he held until 1913. The last years of his life were devoted to the writing of *Modern Democracies,* which appeared in 1921. Mr. Bryce was created a viscount in 1913.

Bubonic Plague, an eastern epidemic, first known in China. It is supposed to be the same as the Black Death which appeared at Constantinople in 543 A. D., and which carried off a fourth of the population of Europe, 1347-52. It is due to the marvelously rapid growth of colonies of bacteria in the lymphatic system. The particular germ, or bubonic bacillus, resembles that of chicken-pox. Within three or four days from the time that germs have entered, usually in food or water, the plague breaks out in swellings and purple spots in the lymphatic glands of the neck, armpits, groin, and elsewhere, accompanied by headache, dizziness, fever, and prostration. Death is likely to ensue within five hours. After forty-eight hours the chances of recovery increase. As in the case of typhoid fever the bubonic bacteria thrive in filth of all kinds and the plague is most severe in the slums; but even the most sanitary districts are endangered by plague-breeding districts. It is chiefly an epidemic of the city. Clean streets, prompt disposition of garbage, and an abundance of water for flushing and thorough drainage,—that is to say, air, light, and cleanliness,—are preventives. Hot, dry air kills the germs; moist, warm filth favors multiplication. Famine stricken people lack strength to withstand the disease.

At the present time the thickly populated quarters of the dirty, underfed poor in the cities of China and India are the centers of the pest most to be dreaded. The utmost precautions are taken at all enlightened seaports to prevent the landing of persons, animals, baggage, or articles of merchandise from a suspected locality without first holding the ship in quarantine to see whether the plague may not break out. Special efforts are made to prevent rats from swimming ashore from infected vessels, lest they carry germs into the houses and sewers of a city. Every ship approaching a port, especially a ship from Asia, must satisfy the health officers that it does not carry infectious diseases. It is not supposed that the bubonic plague can ever gain a permanent foothold in America. It has at times reached the harbor of New York. In 1900 it appeared in the Chinese quarters of San Francisco.

The United States authorities who guard our ports say that the bubonic plague is a question of germs, rats, fleas, and men. The bacillus or germ, which is described as a spindle-shaped rod, breeds in the blood of rats. Without rats, a port will not have the plague. A person may inhale the germs, in which case pneumonia is likely to ensue with deadly results. If the germ get into the blood current, poisoning results and death is almost certain. The two types mentioned, however, are of infrequent occurrence in this country. The ordinary line of bubonic attack lies through the skin, and here is where the flea plays a part. Fleas abound in the fur of rats. They live on the contaminated blood of the rat. The flea that infests the rats is not averse to the body of man. Here he makes an incision and helps himself to human blood. While feeding, the flea, like the fly, deposits a "speck," disgustingly full of bubonic germs drawn in at previous meals, on the body of the rat. When the victim attempts to allay the itching caused by the flea bite, this speck, germs and all, is rubbed into the

incision, and the germs are taken up by the lymphatic system. They are killed by the lymph, but are carried to the nearest lymphatic gland, where they cause inflammation and a swelling or bubo, from which the plague takes its name. This is the least dangerous of the forms of infection; yet seventy-five per cent of the patients die. A crusade has been inaugurated the world over to exterminate the rats in our large harbors, thereby eliminating one source of danger.

Buccaneers, bŭk-kȧ-nērz,′ Central American freebooters. The name is applied to various lawless bands of English and French pirates who haunted the islands of the Caribbean Sea. Their exact number cannot be stated for any particular time. They possessed ships and were well armed. They raided and plundered settlements, pillaged cities, captured merchantmen, and took treasure ships. Their depredations began about 1525 and continued until the beginning of the eighteenth century. They appear to have originated in the desire of the French and English to drive the Spanish shipping out of the Caribbean. English ports were open to them for the sale of Spanish prizes and later they grew so bold and so strong that even the English flag offered a ship no protection from their lawless acts of piracy. At their height they were organized into a sort of piratical republic with a code of laws. They roamed the seas in large bands, dividing their plunder according to fixed rules. The fierce Frenchman, Montbars, and the Welshman, Henry Morgan, were among their famous leaders. The cities of Vera Cruz and Cartagena were among the cities plundered. San Domingo was the center of the French buccaneers; Jamaica of the English.

Bucephalus, bū-sef′a-lus, the favorite warhorse of Alexander the Great. The word is Greek, meaning literally oxhead. When a youth, Alexander won great credit by breaking Bucephalus to ride. He was a colt of unusual spirit, but was afraid of his own shadow,—a fact which Alexander was the first to notice. Alexander kept his head toward the sun. He rode Bucephalus during his Persian campaigns. When the horse died on the banks of the Hydaspes in India, Alexander raised a pillar in his memory and named a military post in the vicinity Bucephalia. See ALEXANDER THE GREAT.

Buchanan, James (1791-1868), the fifteenth President of the United States, was born near Mercersburg, Pennsylvania, of Scotch-Irish parents, and educated at Dickinson College, Carlisle, Pennsylvania. After graduation in 1809, Mr. Buchanan studied law, and three years later was admitted to the Pennsylvania bar. He soon became interested in politics, his first alliance being with the Federalists. In his legal capacity, Mr. Buchanan early gained a reputation as an orator, and when the second war with Great Britain was imminent, he was loud in opposition to it. Nevertheless, when the war came, he volunteered as a private and served at the defense of Baltimore. This was a compromise, and compromise was the one characteristic above all others that marked his subsequent career.

In 1814 Mr. Buchanan was elected to the Pennsylvania legislature; after serving two terms he announced that he would retire to private life, but for personal reasons private life lost its interest for him, and he again turned toward politics and was elected to the national House of Representatives in 1820, serving uninterruptedly from 1821 until 1831. In this capacity Mr. Buchanan's ability as a statesman won him many admirers, and he was appointed minister to Russia by President Jackson. In 1832 he concluded with Russia the first commercial treaty between that country and the United States, a treaty that continued in force until President Taft's administration.

A year after his return, Mr. Buchanan was chosen to fill a vacancy in the Senate. He was again twice elected to the Pennsylvania legislature, and resigned during his third term to accept the position of Secretary of State in Polk's cabinet. During the period between 1831 and 1843 Mr. Buchanan became known as a vigorous pro-slavery Democrat, maintaining that Congress had no control over slavery in any of the states. Nominated for the

Presidency in 1844, he withdrew in favor of James K. Polk, who made Buchanan his Secretary of State in 1845. President Polk left office in 1849, and John Clayton, negotiator of the Clayton-Bulwer Treaty (which see) succeeded Buchanan. This treaty caused immediate controversy, and Buchanan was sent to London by President Pierce for the purpose of settling with the British the vexing Central American question. Though known as a pro-slavery man, Buchanan, who was abroad at the time of the struggle over the Kansas-Nebraska Act, was the Democratic presidential nominee in 1856. He, with J. C. Breckenridge as Vice-President, was elected by a quite large electoral majority, but not by popular majority.

Though Mr. Buchanan had attained a reputation for ministerial ability while acting as Secretary of State and ambassador, his subsequent career was marked by a degree of hesitancy and vacillation greater, perhaps, than that of any other President. His administration opened happily enough; friendly relations with Great Britain were established and the danger of the Central American controversy was removed. But his insistence on the annexation of Cuba and possibly Mexico brought upon him severe criticism from the Republicans, who charged him with desiring to add more slave territory to the United States. But most unfortunate of all was his compromise attitude toward secession, his declaration that while no state had the right to secede, Congress, on the other hand, had no power to interfere in the affairs of a state. And because of popular feeling against him in the North, it was fortunate for President Buchanan and the Union that Lincoln was elected to succeed him in 1860. Subsequently to his retirement, he wrote, in defense of his administration, the work entitled *Mr. Buchanan's Administration on the Eve of the Rebellion.* He died near Lancaster, Pennsylvania, in 1868.

Bucket Shop, an establishment conducted nominally for the transaction of a stock-exchange business, or business of a similar character, but in reality for the registration of bets or wagers, usually for small amounts, on the rise or fall of the prices of stocks, grain, oil, etc., there being no transfer or delivery of the stocks or commodities supposed to be bought or sold. The men who operate such establishments receive commissions similar to those charged by legitimate stockbrokers or commission merchants, and the customers put up "margins," to cover losses which are imaginary. If the market goes against the customer, the proprietor of the bucket shop pockets the "margins"; if the customer wins his bet, the proprietor pays. The margins are soon wiped out as a rule, for they may be as small as $10 for 1,000 bushels of grain, and there is no certainty that the bucket-shop blackboard quotations show actual market prices. The speculator is at the mercy of the proprietor, and some of the latter class have made large fortunes in operating a central establishment in some large city, with numerous branches in small towns. The plant required for operation consists simply of a customers' room and a blackboard on which prices of grain, stocks, etc., are chalked as they are received, ostensibly over private wires from the principal exchanges.

The bucket shop is simply a form of gambling, and as such has long been opposed by the legitimate boards of trade and stock exchanges, which make every effort to prevent their price quotations from being transmitted to such establishments. In many states bucket-shop operation is prohibited by law, and in some of these states they have been declared to be common gambling houses, to be dealt with by the police. Their methods are clearly illegal, for it is contrary to the law in all jurisdictions to wager on the rise and fall of prices of grain or stocks for future delivery, where there is no intention on either side to make an actual delivery, but simply intent to settle on the delivery day the difference between the contract price and the market price in money.

Buckeye, the sweet horse-chestnut. It is a fine tall forest tree of the soapberry family, akin to the maple and box elder. The leaf resembles that of the chestnut. The fruit is a leathery pod containing a

large seed, or rather nut, with a shiny coat and a round, pale scar. The nut resembles the soft, lustrous eye of the Virginia deer, whence the name. The buckeye is found in rich woods from the Ohio Valley southward. Ohio has been nicknamed the "Buckeye State." In addition to the Ohio buckeye, there are othe s, as the red buckeye, the shrubby sweet buckeye, and the white buckeye of the mountains. There are several similar species in various localities in Asia.

Buckingham, George Villiers, Duke of (1592-1628), a British court favorite. He was a native of Leicestershire. He came of an old Norman family and was educated, especially in the manual of arms, in France. James I made him a companion of his son, afterward Charles I, and promoted him rapidly. In two years' time he rose to be knight, gentleman of the bedchamber, baron, viscount, marquis of Buckingham, and lord high admiral. Through his influence with the king and the heir he became the power behind the throne. Social standing, appointment to office, pensions, and preferments of all kinds were dependent on this conscienceless scamp, much to the distaste of the nation. He was graceful in person and could be affable or insolent in bearing,—a hypocrite or a profligate in practice, as suited his ends. For a picture of the audacious Steenie, as he was affectionately called by King James, the reader is referred to Scott's *The Fortunes of Nigel.* Buckingham traveled in disguise with Charles, and intrigued in the arrangements for his marriage with the Princess Henrietta Maria of France. During the wars that followed with France and Spain he proved his own incapacity for public office. He was assassinated by a lieutenant of the army. His son of the same name came into public notice in the reign of Charles II, and lived a life even more shameless than that of the father. Names more unworthy or worthless are not found in the pages of English history. The site of the city home of the family is now occupied by Buckingham Palace, the London residence of the king. It is an imposing, three-story structure, with long wings. It has a frontage of 360 feet on St. James Park. There are the usual throne room, where young ladies are presented, state rooms, galleries, and private apartments.

Buckle, Henry Thomas (1821-1862), an English writer. He inherited sufficient property from his father, a wealthy London merchant, to enable him to carry out his own views of life. He was a man of scholarly habits and of feeble health. He conceived the plan of writing a *History of Civilization,* two volumes of which were completed before his early death. He took issue with the current view that nations rise and fall according to the arbitrary will of Providence. He claimed that climate, soil, food, and the physical nature of a country are the causes that lie at the beginning of civilization; and that, as civilization advances, men become less and less dependent on nature and more and more reliant upon inherited knowledge and mental ability. Also that the effort of the individual is insignificant as compared with the natural trend of national events.

Buckner, Simon Bolivar (1823-1914), an American soldier and politician, was born in Hart Co., Ky. Graduated from West Point in 1844, he was assistant professor of history, geography and ethics there during 1845 and 1846. While serving under Scott in the Mexican War, Buckner was made first lieutenant and then captain. From 1848 to 1850, he served at West Point as assistant professor of infantry tactics, but resigned from the army in 1855. He joined the Confederate Army at the opening of the Civil War, and was the third officer in rank at Fort Donelson when attacked by the Federals in 1862. Generals Floyd and Pillow withdrew from the fight on the night of Feb. 15, 1862, and the next day Buckner surrendered the fort to General Grant. He, with other prisoners of war, was later exchanged. He was Governor of Kentucky from 1887 to 1891.

Buckram. a coarse, heavily sized linen or cotton fabric. It is used for stiffening collars, belts, and certain portions of men's garments. A light weight buckram is used in bookbinding, and for covering carriage cushions. During the Middle

Ages a costly linen fabric, used for church vestments and banners, and to a lesser extent for personal wear, was called buckram.

Buckskin, the dressed hide of a deer. The American Indians were expert in dressing the skin, especially of the Virginia red deer. The green hide was stretched by poles, cleaned of fat and flesh and rubbed with the brains of the deer itself. Buckskin was used for moccasins, leggings, and other articles of clothing not only by the Indians, but by the early settlers as well. The provincial troops were sometimes called "buckskins" on account of their clothing, a custom to which Burns refers humorously in a poem on the American Revolution:

> Cornwallis fought as lang's he dought,
> An did the Buckskins claw, man.

See DEER; LEATHER.

Buckwheat, a cultivated grain related to the smartweeds and belonging to the Polygonaceae or buckwheat family. The Saracens are supposed to have brought it from Asia into Europe by way of Spain. It went for a time by the name of Saracen wheat; but the seed is so strikingly like the nuts of a beech tree that people of England gave it the name of beechwheat or buck-wheat. A similar name prevails among the Germans. There are two or three wild buckwheats, or, at least, near relatives, in America. One introduced from Europe is a troublesome vine in stubblefields. Buckwheat is not one of the extensive crops, but its cultivation is nevertheless quite general in this country and Europe. It is easily raised. It is as tender to frost as a tomato plant, but requires so short a growing season that it may be raised north of the Great Lakes. Buckwheat gains a footing in soil too poor for corn or wheat. It makes excellent fodder. It remains in constant bloom until cut down by frost. For this reason it is planted by many for the benefit of bees, but the honey is dark, and has a strong taste as compared with that made from the flowers of basswood and clover. Standing buckwheat is excellent food for poultry at large, and is quite as desirable when fed in the winter. It is not desirable feed for stock; but buckwheat flour, especially in cold weather, is regarded as indispensable for griddle cakes. Twenty-five states, all north of the Gulf States and east of the great plains, report a total annual production of 15,000,000 bushels of buckwheat. New York and Pennsylvania raise over two-thirds of the total amount; Michigan comes third; Maine fourth. See CEREALS.

Budapest, bŏŏ′dŏ-pĕst, the capital and largest city of the Hungarian Republic. It is situated on the Danube about 135 miles below Vienna. The city took its present name in 1873 from the union of Buda, lying on the west bank, and Pesth, on the east bank. Buda rests on cliffs; Pesth on a plain. The parts of the city are united by a fine suspension bridge, the last on the Danube. Quays second only to those of London extend along the Danube for three miles. Old Buda was a Roman outpost as early as 150 A. D. There are old fortifications, mosques, and monuments commemorative of centuries of contests with the Turks; but Budapest, like its name, is a modern city rising on the ruins of the past. Steamboat landings, warehouses, railway stations, broad, busy streets, parliament houses, and departmental government buildings, a wide-awake university, an academy of sciences, hotels, and modern store buildings, indicate a thriving commercial and administrative city. The population in 1921 was 1,184,616, comparable with that of Glasgow. Budapest is noted for its electric works. Many of the devices connected with electric lighting, motors, and trolley lines were invented here. There are large manufactures of brass and copper wire, gold and silver plate, iron, wood, and machinery. It is one of the world's great grain markets, and rivals Minneapolis as a milling center. The roller process, a method of crushing grain between steel rollers instead of grinding between millstones, is a Hungarian invention. See HUNGARY; AUSTRIA-HUNGARY.

Buddha, bŏŏ′dä, the founder of Buddhism. The name Buddha means "the enlightened," and is in reality a generic term denoting a deified teacher. Buddhists claim

that many Buddhas have lived and taught. The one to whom the name came to be applied specifically, because of his great work as a reformer, was named in reality Siddhartha Gautama. He is supposed to have been born about five hundred fifty years before Christ. We have little knowledge of his life which can be called historical, but with the few facts are interwoven many traditions faithfully believed by Buddhists. He was the son of a Hindu prince who lived a short distance north of Benares, India. He was born in a pleasant garden by the river side, while his mother was on a journey to the home of her father. Many stories are told of the miracles attending his birth, of the prophecies pronounced when his father first looked upon the child, and of how, as the mother continued her journey, the baby was protected from the heat of the sun by cool shadows which moved above his head.

Siddhartha grew to be a handsome and intelligent youth, but too thoughtful to suit his parents' ideas of a happy prince. They therefore married him at an early age to his young cousin, the beautiful daughter of a neighboring king or raja. It appears that the young man now went to the other extreme; for we read of his relatives complaining to his father that he lived for pleasure only, and would be incapable of leading an army, should war arise. Gautama, hearing of this, appointed a day when his prowess should be tested At this trial the young man proved himself superior, not only in manly exercises, but in knowledge, to all competitors. Complaints ceased, and Gautama pursued his own course. In the midst of his pleasures, however, he observed many things which made him ponder deeply. He saw a man bent with age. Asking Channa, his charioteer, why such things should be, he was told that age is the common fate of all. He saw a man afflicted with a loathsome disease, and Channa told him that all must suffer. He saw a corpse, and learned that all must die. Pondering these things, and striving to solve the mysteries of life and death, Gautama at last left his family and lived for years as a recluse. For some time he practiced the most severe penances and self-denial, but he learned the uselessness of such practices, and finally, while sitting under the "Bo-tree," known from that time as the tree of wisdom, he became "enlightened." When he had thus evolved a system of religious beliefs and a code of morality satisfying to his own mind, he began to teach his doctrines and soon made many converts.

There is an old Buddhist hymn which relates how an acquaintance met Buddha as he started out with the joy of his new religion shining in his face, and asked him where he was going. His answer was, "I am going to the city of Benares to establish the kingdom of righteousness, to give light to those enshrouded in darkness, and open the gate of immortality to men."

Buddha made it his custom to gather his disciples about him for instruction during the rainy season. When that was past, they separated for the purpose of spreading the new doctrines. According to tradition Buddha lived to be almost eighty years of age, continuing to teach until the end. His last words were spoken to his faithful disciples.

Buddhism, bo͞od′dĭzm, a form of religious belief. The name is from Buddha, a word meaning teacher. Buddhism may be regarded as a reformed Brahminism. Clarke, in his *Ten Great Religions,* calls the Buddhists the Protestants of the East. Buddha began his teaching at Benares, India; but his followers appear to have been driven from Hindustan at a later period. Brahminism, however, acknowledges a trinity, while Buddhism does not recognize any supreme being. Buddhism rejects also the castes of Brahminism. Any one may become a Buddhist priest, but the priest is only a monk; for in this religion there are neither sacraments to administer nor rites to perform. The four "sublime verities" which lie at the foundation of the religion of Buddha are:

1. Pain is inseparable from existence.
2. Pain is the offspring of desire.
3. Existence can only cease with Nirvana.
4. Nirvana may be attained only through the extinction of desire.

The Buddhist religion accepts the Brahminical theory of the transmigration of souls. According to this theory, gross, that is to say, ordinary souls are born over and over, and are thus required to pass repeatedly through a world of birth, sin, suffering, and death. After the purification of countless existences the soul may be absorbed at last into Nirvana the Blest, a state where all desire is extinct. Buddha himself was believed to have passed through every possible form of existence before he became "the Enlightened."

The extinction of desire, which leads into the "path" to Nirvana, is acquired by the fulfillment of eight conditions. These are right view, right judgment, right language, right purpose, right practice, right obedience, right memory, and right meditation. Five precepts to be obeyed forbid man to kill, to lie, to steal, to commit adultery, and to fall into drunkenness. The virtues to be cultivated are charity, purity, patience, courage, contemplation, and knowledge. If acquired in this life, these virtues lead to a painless existence in the next life. As a mere ethical code Buddhism ranks second to Christianity. It is a mild code of morals, abhorrent of cruelty. The Brahminical practices of infanticide and burning of widows on their husbands' funeral pyres were forbidden by Buddhism.

See INDIA; BUDDHA.

Budding. See GRAFTING.

Budget, a bag or package of miscellaneous articles, as a budget of old clothes or a budget of news. In the history of England the budget is an annual statement of finances read by the chancellor of the exchequer before the House of Commons. It contains a statement of expenses necessary for the coming year, and proposes a scale of taxation to provide the means. Sometimes the chancellor is able to propose a reduction of taxation in certain directions, and sometimes he is under the grave necessity of proposing extraordinary expenditure and grievous taxation. The term is coming into general use in discussing the finances of any nation. The amount of annual expenditure is given in statistics accompanying the countries of importance.

UNITED STATES. A budget system was adopted in the United States in 1921, and the Bureau of Budget was created. The bill authorizing the establishment of the budget makes the President the head of the budget system; creates the Bureau of Budget; requires that the President submit the budget to Congress at the beginning of the regular session each year; and requires that Congress be told at that time exactly what the revenues and expenditures for the year are to be and what is the state of the public debt. This report must contain recommendations for increasing or decreasing the revenue, as need may require; must give details of expenditure for the year past; and must give much other necessary information regarding the national finances.

The system is a great improvement over the old haphazard, inaccurate financial methods that have obtained in the past. Under the old plan, there were 41 expenditure bureaus, which in the new system have been consolidated under one head, known as the Federal Purchasing Board. Each expending department is represented on this board, the chairman of which acts as chief coordinator. Each minor board is to have charge of certain branches of government or expending bureaus, and this expenditure plan, it is asserted, will insure the annual saving to the government of hundreds of millions of dollars.

Buell, Don Carlos (1818-1898), an American soldier. He was a native of Ohio, received his education at West Point, served in the Seminole and Mexican Wars, and attained the rank of adjutant-general in the regular army. When the Civil War broke out he was appointed brigadier-general of volunteers. He succeeded Sherman in the department of the Cumberland, and his troops helped save the day for General Grant at Shiloh. In 1862 he assumed command of the Army of the Ohio, and began a campaign in Kentucky and Tennessee. October 8, a battle was fought at Perryville, Kentucky, in which General Buell drove General Bragg from the field. Buell was severely criticised for allowing Bragg to escape. He was at once removed from command and from November of

that year until the following May was before a military commission appointed to investigate the campaign. The report of the commission was never published in full, but it was in the main unfavorable to Buell, who in consequence refused any assignments, although several were offered him. The general opinion of critics seems to be that General Buell lacked tact in dealing with subordinates and that he was somewhat dilatory in situations requiring prompt and decisive action, but that in the main he was an able officer and a good strategist.

Buena Vista, Battle of, an important battle of the Mexican War, between a force of 5,000 Americans, under General Zachary Taylor, and a Mexican army of about 17,000 under Santa Anna. The battle was fought on February 22-23, 1847. The Mexicans took the offensive, endeavoring to dislodge Taylor from a strong position on Angostura Heights. They almost succeeded, only the poor generalship of Santa Anna saving the Americans from defeat. The Mexicans were driven from the field on the second day. The Americans lost about 750, while the Mexican losses were fully 2,000. This was the last important engagement of the northern campaign and gave the Americans control of northeastern Mexico. It was one of the most brilliant battles of the war.

Buenos Ayres, bō′nŭs ā′rĭz, the capital of Argentina. It is the largest Spanish-speaking city,—the largest Catholic city,—in the world. It is the largest city in the world south of the equator. The name is Spanish, signifying good air. The city is beautifully situated on the wide estuary of the La Plata and has public wharves extending three miles along the water front. They cost not less than $25,000,000. There are 300 miles of street railways, both horse and electric, fine streets, and public parks. Of a population estimated in 1921 at 1,674,000; 200,000 are foreigners. A city hall, arsenal, government mint, large churches, theaters, cathedral, museum of natural history, parks, and libraries give the city quite a Parisian appearance, while the atmosphere of bustle and activity is more American than Spanish. There are enormous warehouses for wool, built like train sheds. Ocean freights are low. It costs only about a cent to send wool enough across the Atlantic to London to make a suit. Fondness for amusement is noticeable. American residents speak of a wonderful spirit of public liberality shown by citizens. One of the daily newspapers has erected a costly building, an ornament to the city, and has set apart a portion for the public. A share of the revenue of the paper is devoted to the maintenance of a free library, a museum of natural history, an office for free legal advice, an office for free medical service with six physicians in attendance, rooms for literary and social clubs, and, what seems strangest of all, elegantly furnished apartments for the reception of distinguished visitors from abroad. With waterworks and sewerage the city has a low death rate and is in many respects a model for North American cities.

A national meteorological bureau is stationed at Buenos Ayres, one of the best equipped in South America. The national university located here was founded in 1821; it has about 10,500 students. As in other cities of the Argentine Republic, primary education is free, secular and compulsory. The preparatory education is taken care of by the government at the national university.

The population is cosmopolitan, like that of other great cities of the world, though native Argentinians, descendants of the old Spanish settlers, comprise about one-half of the inhabitants.

In 1535 and 1542 unsuccessful attempts were made to found a Spanish colony on the site of Buenos Ayres. The present city was settled in 1580. Its growth has been steady, and this was one of the chief reasons for its being chosen as the capital of the province of Rio de la Plata. From 1851 to 1859 Buenos Ayres, with the province of the same name, was a separate state. However, difficulties arose which led to its secession, and since 1880 the city has been the capital of the republic.

Buffalo, the principal lake port of western New York. It is situated on Lake Erie, at the western terminus of the New York State Barge Canal, formerly the Erie

Canal. This canal was rebuilt by the State at a cost of $150,000,000, and was opened for traffic in 1919. In 1915 a tunnel 6,500 feet long and a pumping station were completed for bringing water from Lake Erie. The tunnel has a capacity of 150,000,000 gallons every 24 hours. Buffalo's industrial growth has been rapid in recent years, representing 58 per cent of all the different products taken into account by the United States Census Bureau. The grain elevators have a capacity of 28,500,000 bushels, the grain received by boat averaging 108,825,000 bushels yearly. The live stock industry is flourishing, and others of importance are iron ore, coal, flax seed, lumber, and iron and steel products.

In 1914 a new commission charter was adopted, which substituted the commission form of government for the former system of a bicameral council and mayor.

The first commission government took office in January, 1916, the government consisting of a mayor and four councilmen under State laws.

The school system of Buffalo is adequate and modern. The city's system of adult education is said to be the largest and most comprehensive from the standpoint of service rendered of any city of this size in the United States. A recent report gives the following interesting statistics: Number of pupils enrolled (including men and women), 23,270, to whom instruction was given in the following subjects:

Immigrant Education—Evening, factory and home classes in Immigrant English and Citizenship

Elementary Education—For illiterates.

Academic Education—For culture and professional advancement.

Commercial Education—Including all branches of office practice.

In 1919, $8,000,000 were appropriated for building new grammar schools. The University of Buffalo was given an endowment fund of $5,200,000, raised by popular subscription in 1920, while Canisius College (Jesuit) raised by subscription an endowment fund of $1,000,000.

Important new buildings are those of the Marine Trust Company, Erie County Savings Bank, New York Telephone Company, the Electric, Iroquois and Y. M. C. A. buildings. There are several other fine structures, notably the Weed, the Pierce, the new Ellicott, the Athletic Club, the Lafayette Theatre, the Saturn Club, and the new Consistory buildings; the new 1,000-room Statler Hotel, the new Ford Hotel, and a modern new hospital building. There are also many fine churches, clubs and office buildings, of which the Ellicott Square covers an entire block.

The region in which Buffalo is located was visited by La Salle in 1679, when he built near the site of the present city the first boat that sailed on Lake Erie, a small vessel of only 60 tons, called the *Griffin*. There was only one settler here in 1792—a man named Winney, who was a trader. Between 1792 and 1793 an organization calling itself the Holland Land Company purchased a tract of land in this vicinity, which was subsequently laid out into townships by Joseph Ellicott, known as the "founder of Buffalo." The owners of the land decided to establish a town (New Amsterdam), at the mouth of Buffalo Creek, and in 1803 and following years a village was platted, under Ellicott's supervision. Though the legal name was New Amsterdam, the new village soon was known as Buffalo, probably owing to the fact that large herds of Buffalo visited the salt licks here. In 1810 the township of Buffalo, which included the present city, was incorporated. The first newspaper published in Buffalo (1811), was the *Buffalo Gazette*.

In 1813 a British and Indian force of 1200 men under General Riall, captured Buffalo and almost destroyed it by fire. It was rebuilt in 1815, its growth being slow, until the completion of the Erie Canal in 1825, when it became an important distributing center between the East and the West. In 1832, with the population of 18,000, it became a city. Buffalo was the home of Millard Fillmore and Grover Cleveland. Population, 1920, 506,775.

Buffalo, an animal of the ox kind native to Africa and southern Asia. It has a hump on its shoulder. The name has

been applied unfortunately to the American bison, for an account of which the reader is referred to an article under that name. There are three distinct species of true buffaloes. A chestnut colored species ranges throughout central and western Africa. A bluish black, nearly hairless species, known as the cape buffalo, ranges from South Africa to Abyssinia. Its enormous horns are joined at the base. They lop down and backward towards the ears, but curve forward and inward over the forehead again, making a complete shield of defense for the head. This animal is attended regularly by the buffalo bird, which lives on parasites picked from the thick hide of the buffalo, for which it renders compensation by sounding the alarm if an enemy, that is to say, a lion or a man, is seen in the vicinity. If the buffalo should be asleep and not heed the cry of its little sentinel, the faithful bird, it is said, thrusts its bill down and picks its host's ear, and thus awakens it, when they dash off together to a place of safety.

The third species is the black buffalo of India. It has long, triangular horns, which curve backward toward its shoulders. These horns are much flattened, and are surrounded with wrinkles, much like those of an ox. In its native home in the jungles it is considered a dangerous animal, as it has an ugly habit of charging upon hunters with the utmost recklessness. It has been widely domesticated, and is used by the peasants of Egypt and India much as domestic cattle are with us.

The buffalo is the principal beast of burden in the Philippines, also. It is used to plow, to draw carts, and for a great variety of similar purposes. The buffalo is able to work in swampy ground, where horses and ordinary oxen cannot travel. If allowed to bathe occasionally in mud and water, it is able to endure an unusual degree of heat. It lives on the coarsest forage. The buffalo cow yields milk. Both the cow and the ox are valuable for food and for their hides. The Asiatic buffalo is as indispensable to the peasant farmers in swampy lands of tropical countries as the reindeer, the yak, and the camel are to other localities.

Travelers in the Philippines say that the the buffalo is to the Filipino peasant what the mule is to the southern darkey. The buffalo drags the peasant's wooden plow through the mire of the rice swamps, lives on the roughest forage, yields milk for the family, is fondled by the children, and is a patient domestic companion. White people are regarded with distrust. The white man who comes around a turn in the road, and is discovered by buffaloes wallowing with their calves in a pond or stream, must be on the lookout lest he be charged at full speed by the alarmed animals.

Buffalo, American. See BISON.

Buffalo Bill. See CODY, WILLIAM FREDERICK.

Buffalo Fish, a species of the sucker of the Mississippi Valley, belonging to the *Bubalichthys* or *Ictiobus,* getting its name from the humped outline of its back, large head and generally dark colors. The *Ictiobus cyprinella,* red-mouthed buffalo fish is of an olive-brown hue, weighs from 20 to 30 pounds, and attains a length of 3 feet. The *Ictiobus urus* is another large variety, very dark and having black fins. The *Ictiobus bubalus altus,* the small-mouthed buffalo fish, is of a lighter color, and makes its home in more southerly waters.

Buffalo Grass, a North American grass highly valued in the West for fodder. It is a low, strong-growing grass, spreading rapidly by runners, the blades becoming curly and crisp when burned by the summer sun. It is well adapted for regions of scanty rainfall, and possesses nutritious qualities acceptable to all stock. The name Buffalo grass has been given this grass because it once formed an important part of the food of the buffalo.

Buffon, George Louis Leclerc (1707-1788), a celebrated French naturalist. Educated at Dijon for the law, but permitted by an intelligent father to follow his inclination for natural history. After traveling in England and Italy, Buffon was admitted to membership in the Academy, a French learned society, and, later, was appointed to a position in the royal garden and museum. Buffon conceived the project of a *Natural History*

in French which should popularize the science. In this he succeeded. His history passed through several editions and was translated into foreign languages. Many condensed editions were sold. Buffon's *Natural History* in a single volume, with extended accounts of the cat, dog, and other domestic animals, was a household favorite in England and America fifty years ago. Scientific men have found fault with Buffon for inaccuracy, claiming that he preferred to write brilliantly rather than accurately, and certainly he was an entertaining writer. A complete edition of the *History* in French, 1749-1788, filled thirty-six volumes. His *History of Quadrupeds* is considered the best single part of the work.

Bug, a large sub-order of insects. The term is too often applied to beetles as well. The wing covers of a beetle are horny throughout, and meet in a straight line on the back like edges of a clam shell. The front wings of a bug are hard and horny only part way. The tips are thin or gauzy and overlap when folded. The wings of flies are gauzy throughout. Potato bugs, June bugs, rose bugs, and lady bugs are all beetles. The chinch bug, the squash bug, and the cotton-stainer are true bugs. The bedbug is rightly named. Like other insects, bugs breathe by tubes situated in the sides of the abdomen. The water boatmen that dive like silver bubbles carry air surrounding their bodies. The back-swimmers that float around on their backs carry down a supply of air under their wings. The longlegged, slender, water-striders that dart around each other on the surface of a quiet pool are also bugs. Toad-shaped bugs, shore bugs, assassin bugs, ambush bugs, flat bugs, leaf bugs, red bugs, stilt bugs, stink bugs, lace bugs, and negro bugs are all too numerous for description, and must be studied with a textbook like Comstock's *Manual.* The electric light bug is the largest bug known in America.

Buhl, būl, a sort of inlaid work named for the famous French cabinetmaker of that name, 1642-1732. The term was applied originally to a pattern of highly polished brass, set with care in a surface of some other metal or of wood. It is now applied chiefly to inlaid work in veneer. Two sheets of wood of contrasting colors, as maple and black walnut, are glued together with an intermediate sheet of paper. A pattern, as of an ivy vine, is traced on one surface and cut out with a fine scroll saw running through both woods. The two woods are then split apart through the paper cleavage. If the sawing is true, the two ivy vines may exchange places. The light ivy vine fits into the dark border, and the dark ivy fits into the light border. By gluing the two veneers to wooden backs and finishing, two pieces of inlaid wood, or buhl work are produced. This method is employed by makers of furniture and ornamental woodwork. See FURNITURE.

Buhr, or **Burrstone,** a variety of quartz distinguished by flinty hardness and numerous small air cavities. Buhr of excellent quality is found in the quarries of western Pennsylvania and adjacent parts of Ohio, but the French buhr is by far the best. Cut into wedge-shaped pieces and bound together by heavy metal hoops, buhr is the material of which millstones are made. Before the invention of the steel roller process the flour and meal of the world was ground between upper and nether millstones of buhr. Many millers have not discarded millstones yet. With use, millstones become too smooth to grind and must be roughed by the use of a hammer or pick with a steel edge shaped like that of a chisel. Picking millstones must be done by a uniform tap-tap and is an art in itself. See FLOUR.

Building and Loan Associations, cooperative unions designed to receive the savings of many wage-earning members and loan them to a few members for the building of houses. The system originated in Philadelphia about 1835. It has spread over a large part of the United States, until the various associations are credited with doing not less than $750,000,000 worth of business annually. The gist of the plan and the secret of its success lies in low expenses and the putting of many small savings at interest promptly. On the other hand, the moneys are loaned on good security to be returned, in-

terest and principal, usually in weekly payments running through a term of ten to fourteen years. Though the total amount returned by the borrowing member may not exceed the principal and interest for the entire term at, let us say six per cent per annum, the rate of profit to the association will be at least twice six per cent. In the first place, the borrower returns part of the principal out of his first week's wages, which he can do quite as well as to hold his savings for a large payment. On a fourteen-year plan, he holds only the last installment of principal fourteen years with an average time of seven years. Interest is also paid weekly instead of being held for an annual payment. The wage earner is far more certain of himself in making many small payments than in trying to accumulate for large payments. So, without hardship to the borrower, in fact, while helping him, the non-borrowing members of the association are encouraged to save and receive from three to five times as much interest as savings banks could afford to pay them.

The success of local societies has encouraged the organization of associations that operate over large territory. Many of these from the first have been mere schemes to despoil the depositor. Salaries and other expenses have eaten up all possible dividends, and recklessness in placing loans has caused loss. Others, organized in good faith, have not been successful. In general it may be said that a building and loan association should remain local, and confine its business to loans that may be looked after by a committee of members, or, at most, by a trusted secretary acting under the direction of an executive committee.

There were in the United States in 1917 7,072 building and loan associations, having 3,568,432 members and assets valued at $1,598,528,136.

Bulb, a short and stout underground leafy stem, formed by several plant families, especially the lily family. It consists primarily of a solid, flat, horizontal portion. The under side of this plate produces roots; the upper side is covered with thick, fleshy leaf bases in the center of which may be found a bud from which a new plant is developed. The outermost scales are usually thin and dry, a single scale surrounding the entire bulb; and sometimes the outer scales are fleshy and narrow. The onion is an excellent example of the first,—the coated or tunicated bulb. The bulb of the wood-sorrel is of the other sort. See LILY; NETHERLANDS.

Bulbul, the Persian name of a sweet singing rock thrush heard at night in oriental countries. It is a species of nightingale. It has been brought to notice by the *Arabian Nights' Entertainments,* and by the poems of Moore and Byron. There are several brilliantly colored species. The bulbul of India is familiar in gardens. The males fight with such pugnacity that they are trained by the natives and exhibited in sparring matches. See NIGHTINGALE.

Bulgaria, bŏŏl-gā′rĭ-a, a kingdom of Europe. It is situated on the east bank of the Danube and extends from Jugo-Slavia to the Black Sea. Its area is 38,080 square miles—twice that of Switzerland. By the census of 1920, the population of Bulgaria was 4,861,439. The capital city, Sofia, has a population of 154,431.

Bulgaria is a seat of ancient culture. Formerly a part of the Roman Empire, it was occupied by the Slavs. It was the first Slavonic territory to accept Christianity. The Christianity of the Russians was the result of missionary work emanating from this district. The Russian language assumed a fixed literary form here. The earliest Russian books were written in Bulgaria. Latterly the people were corrupted by the infusion of Tartar blood and were degraded by centuries of Turkish domination.

In 1878 Bulgaria, assisted by Russia, established its independence. A nominal tribute was paid to Turkey. In 1885 Eastern Rumelia was "confided" to the prince of Bulgaria and has since been a part of that country. In 1908 Bulgaria asserted entire independence. Progress has been rapid. Legislative authority is vested in a national assembly of one house. Universal manhood suffrage prevails. Any man thirty years old who can read and

write, and who is not a priest or an active soldier, may become a candidate. The national faith is Orthodox Greek, but the church is independent. Freedom of worship prevails. Clergymen of all denominations are paid by the state. They are supported in large measure, however, by fees received for services at weddings, burials, etc.

The country is traversed by the Vienna-Constantinople Railway and has the advantage of navigation on the Danube. Telephone and telegraph lines have been established. A university is maintained at Sofia. The common schools are free. Attendance between the ages of eight and twelve is obligatory.

The surface of Bulgaria varies from mountain to plain. All minerals belong to the state. The people live in villages. The plow land is held, theoretically, by the state. It is leased in small farms of five or six acres, the lease descending from father to son. A rent of one-tenth of the produce is paid by way of taxes. The villages or communes own the pasture and woodland, but pay no taxes. Each villager has grazing and wood-cutting rights. The soil is rich and productive.

Attar of roses, wine, silk, tobacco, carpets, hosiery, and ribbons are exported.

In October, 1912, Bulgaria became allied with Greece, Servia and Montenegro in a war against the Turks. Turkey was practically driven out of Europe by May 30, 1913. Unable to agree on the division of the conquered territory, a second war broke out with Bulgaria opposed against her former allies and Turkey. This was very disastrous to Bulgaria. She lost practically all of the territory which would have fallen to her by the first treaty, Albania was created a new monarchy, Turkey regained part of her former losses, and the borders of most of the Balkan states and Greece were extended. In 1915 Bulgaria joined the "Central Powers" in the War. She hoped in her grasping, brutal militarism to get hold of Servian Macedonia, the control of which had long been the source of quarrel with Servia. The plan was foiled by the Allies, and the fate of Macedonia left to the League of Nations.

Bulgaria has been vexed with various internal troubles, and in April, 1923, had to put down the rebels who attempted to overthrow the government.

STATISTICS. The following statistics are the latest to be had from trustworthy sources:

Land area, square miles	40,656
Population (1920)	4,861,439
Chief Cities:	
Sofia	154,431
Philippopolis	63,418
Varna	50,819
Ruschuk	41,574
Slivno	28,695
Number of districts	15
Members of National Assembly	227
National revenue	$18,000,000
Bonded indebtedness	$160,000,000
Farm area, acres	9,920,175
Wheat, bushels	42,510,000
Corn, bushels	34,385,000
Rye, bushels	8,390,000
Oats, bushels	11,271,000
Barley, bushels	13,241,000
Potatoes, bushels	1,650,000
Rice, bushels	5,642,000
Sugar Beets, short tons	8,267
Tobacco, pounds	53,490,000
Grapes, tons	75,910
Cattle	1,885,620
Sheep	7,340,900
Goats	924,554
Manufacturing establishments	486
Coal mined, tons	748,085
Imports	$440,000,000
Exports	$325,000,000
Attar of roses exported annually	$1,500,000
Miles of railway	1,581
Teachers in pubic schools	10,068
Pupils enrolled	474,242

Bull, an authoritative document issued by the popes, "usually an open letter containing some decree, order, or decision relating to a matter of grace or justice." The document is sealed with a globular leaden seal or *bulla*. The *bulla* is attached to it by a red or yellow thread, if relating to matters of grace, and by an uncolored strand of hemp, if relating to matters of justice. One side of the *bulla,* somewhat flattened, bears the heads of St. Peter and St. Paul; the other bears the name of the pope. The writing is in Latin on the finest parchment. A papal bull opens with the name of the pope. Thus the form is *"Pius, episcopus, servus servorum Dei, in Domino salutem et apostolicam benedictionem,"*—"Pius, bishop, servant of the servants of God, in the Lord salutatior

Entering the Arena

Blindfolded Horse Attacked

Attack of the Picador

The Bull's Last Charge

BULL FIGHTING, in Mexico

and apostolical benediction." The red seal of the pope is attached to the parchment itself. The term "papal bull" is akin to government bulletin. It has no relation to the similar word signifying a blunder. In 1758 an edition of papal bulls and briefs was published in nineteen volumes at Luxembourg. The editing required thirty years. For imperial bulls, see GOLDEN BULL.

Bull, Ole Bornemann (1810-1880), a celebrated Norwegian violinist. A native of Bergen. His father wanted him to study for the ministry and would not permit a musical instrument in the house. At Christiania, 1828, he played in a concert with such skill that he was made music director of the city. After study in Germany and at Paris, Bull traveled, giving concerts. He had an ambition to outdo Paganini in violin tricks; but, though accomplished, could not excel him. Bull was received with tremendous enthusiasm. In 1844-50, 1853, and 1869 he made tours of the United States. Bull made a fortune out of his concerts, but spent a large part of his earnings in an unsuccessful attempt to colonize his countrymen in Pennsylvania, where he bought up 125,000 acres of rough land. See VIOLIN.

Bullard, Robert Lee (1861-), an American soldier, commander of the 2nd army of the American Expeditionary forces in France, in 1918. He was born at Younsboro, Ala., and educated at the Agricultural and Mechanical College of Alabama and at West Point Military Academy. He was colonel of the Third Alabama Volunteers in the Spanish-American War. He was in service under General Pershing in the Philippines, and in 1916, he was with the army in Texas, in connection with the border troubles. In 1917, he was made brigadier-general, then promoted to major-general in the National Army. Bullard accompanied General Pershing to France and in June, 1918, was given command of the Second American Army, with the rank of lieutenant-general during the war.

Bulldog. See DOG.

Bullet, the leaden projectile of small arms. Bullets were originally spherical. It is in this sense that the term bullet-headed is applied to a person with a short, round head. The elongated minie bullet was introducd by the French in 1846, and has been succeeded by still more elongated bullets. The modern bullet of the cartridge for a breech-loader, as of the Mauser, is about three inches long, with a diameter about one-tenth of the length, and a weight of 216 grains. It is usually coated with steel, copper, nickel, or german silver. The dum-dum bullet, condemned by rules of modern warfare, has an unprotected lead point that flattens on striking, and produces a ragged wound.

Bullfighting, a Spanish sport, supposed to be of Greek and Roman origin. It was introduced into Spain by the Moors and became popular throughout Spain and its New World colonies . It is still maintained in some Spanish cities and in Mexico. The fight takes place in an arena surrounded by raised seats for the spectators. The bulls are introduced one at a time. Horsemen called picadores begin the attack by goading the bull with lances and evading his charges as best they may. Later in the game a number of young men enter and further torment the infuriated animal by throwing darts at him. Soon he is carrying scores of arrow-like darts. When the animal has been tortured and goaded to exhaustion, the matador advances and slays him. The dead bull and injured horses are dragged out, and another bull is entered. See SPAIN.

Bullhead. See CATFISH.

Bullion, bul′yŭn, uncoined gold or silver. The coining value of an ounce of pure gold is $20.67183; of silver, $1.2929. In coinage it is customary to take nine hundred parts of pure gold or silver and one hundred parts of copper alloy to give hardness. Bullion thus alloyed is called standard bullion. The world now produces about 15,000,000 ounces of gold bullion and 164,000,000 ounces of silver bullion a year. See GOLD; SILVER; MINT; COIN.

Bull Run, Battle of, the first battle of the Civil War. It occurred Sunday, July 21, 1861. The battlefield is in Virginia, about twenty-five miles west of Washington. The Confederate army un-

der General Beauregard lay at Manassas in position to defend Richmond. The Federal troops under General McDowell advanced to attack them. About 28,000 troops were available on each side. At first victory seemed on the Union side. The Confederates thought they were defeated; but the Union troops lost courage just in time to save their opponents. Demoralization grew into panic; and a retreat, degenerating in many instances into every man for himself, ensued. The Federal army, accompanied by spectators, citizens, and even congressmen, rushed pell mell for the bridges that lead across the Potomac into Washington, and left the corpse-strewn battlefield to the Confederates. Supplies, guns, ammunition, wagons, everything that could be thrown away to lighten flight, was left by the wayside. Something less than 1,000 men were killed in the battle and nearly 3,000 were wounded. The Union loss was, of course, the heavier. At this date the retreat may seem ludicrous; but it was a serious affair at the time and showed that the war was to be no pretense.

A second battle of Bull Run, sometimes called the battle of Manassas, was fought August 29-30, 1862, between the Confederate troops under Lee and the Federal forces under Pope. Lee's forces numbered about 54,000, Pope's 65,000. After two days of stubborn fighting the Federal troops were driven from the field, leaving 10,000 killed and wounded. The Confederate loss was almost as heavy.

Bulwer-Lytton, bool'wer-litton, **Edward George Earle** (1803-1873), an English novelist. He was a native of London. Lytton was his mother's family name, which he appended to his own on inheriting the Lytton estates. He sat in Parliament and, as colonial secretary, became a member of the cabinet. He is credited with liberal views in the setting up of the government of Australia. In 1866 he was raised to the peerage as Baron Lytton. Bulwer produced a few dramas and many novels. His collected writings fill 110 volumes. By far the greater number of his stories belong to that class which Taine calls "the novel of manners." A few are historical and some have psychological and occult themes. Bulwer did not possess a powerful imagination, nor did he have high ideals. There seems, moreover, a lack of human sympathy in his stories. His novels, however, show versatility and great range of power. They are full of incident and present interesting and instructive pictures of contemporary life. *The Last of the Barons, The Last Days of Pompeii,* and *Rienzi* and *Harold* are powerful historical novels that merit place in every well selected library. *The Lady of Lyons* and *Richelieu* are the best of the dramas. Among other novels may be mentioned *Eugene Aram, The Caxtons, Alice, or the Mysteries, Ernest Maltravers,* and *My Novel.*

Bulwer was one of the most industrious literary craftsmen of the Victorian Era.—Nicoll.

QUOTATIONS.

Curses are like young chickens,
And still come home to roost.

Beneath the rule of men entirely great,
The pen is mightier than the sword.

In the lexicon of youth, which fate reserves
For a bright manhood, there is no such word
As "fail."

Bumblebee. See BEE.

Bungalow, the thatched cottage of Bengal, India. The word is of Hindu origin. In point of cost the original bungalow is to be associated with the German hut, the Swiss chalet, the English cottage, the Scotch shieling, and the Irish shanty; but, as a matter of fact, the name is given in India to expensive structures. Bungalow is becoming a familiar word in America also, where it is used as synonymous with cottage. The typical bungalow is but one story high. The eaves spread far out to cover a veranda running quite around the house. The roof may be of any material from thatch to tile. The windows and doors are large. The entire structure is planned to secure plenty of air and room. Protection from insects and rain are the chief considerations. For the convenience of travelers the Indian government maintains "bungalows" at intervals of twelve to fifteen miles along the main traveled roads. They are places of shelter. The traveler is expected to provide his own fare.

Bunker Hill, a low hill 110 feet high in Charlestown, Massachusetts. It is memorable, in connection with Breed's Hill, as the site of the battle of Bunker Hill, June 17, 1775. The Americans under General Prescott fortified the height in a hasty manner and were driven out by the British, but only after a gallant resistance and when their powder failed. The British lost 226 men killed and 828 wounded. The Americans, being behind breastworks except during the retreat, lost 145 killed and 304 wounded. Bunker Hill monument stands on Breed's Hill, as near as may be where Dr. Warren fell. It is a massive granite shaft 31 feet square at the base, 15 feet square at the top, and 220 feet high. Lafayette laid the corner stone, June 17, 1825. Webster delivered the dedicatory oration, June 17, 1843. The monument may be ascended by an interior stairway. The summit commands a magnificent view of Boston and the harbor.

Bunner, Henry Cuyler (1855-1896), an American journalist and author. He was born in Oswego, New York. He began a journalistic career at the age of eighteen. He became the editor of *Puck* shortly after its start and held the position for the rest of his life. Among his writings may be mentioned *A Woman of Honor, The Story of a New York House, The Midge, Short Sixes,* and *The Runaway Browns.* Bunner will be longer remembered, perhaps, and better loved, for some of his tender little poems than for any of his prose. Everybody knows *One, Two, Three,* the story of

> An old, old, old, old lady
> And a boy that was half-past three.

Bunner excels, too, in certain French forms of poetry, which have become favorites in later years. An example of one of these is the triolet given below. A triolet is limited to eight lines and two rhymes:

> A pitcher of mignonette
> In a tenement's highest casement;
> Queer sort of a flower pot—yet
> That pitcher of mignonette
> Is a garden of heaven set
> To the little sick child in the basement,
> The pitcher of mignonette
> In the tenement's highest casement.

Bunsen, boon'sen, **Robert Wilhelm** (1811-1899), an eminent German chemist. He entered the University of Göttingen when he was seventeen years old and devoted himself to the study of zoölogy and chemistry. He later continued his studies at Paris, Berlin, and Vienna. He wrote numerous papers on physics and geology, as well as on chemistry. He invented the magnesium light, which is so important in photography. His greatest discovery was that connected with spectrum analysis. The spectrum is essentially a magnifying lens attached to a glass prism. By means of this instrument, elementary substances, such as sodium, copper, or lead, may be discovered in the sun and stars. Dark lines occur among the colored spaces in the solar spectrum, and Bunsen, together with his friend Kirchhoff, demonstrated the meaning of these lines, first observed by Fraunhofer in 1815. Bunsen's and Kirchhoff's discovery has been of great value to chemistry and to astronomy. Its first result was the discovery of two new metals. Besides being a great discoverer in chemistry, Bunsen was an able teacher. He held a number of important chairs—at Cassel, Marburg, and Breslau. From 1851 to 1889 he was a leading professor at Heidelberg, one of the men who drew a crowd of American students to that celebrated university. The laboratory burner which bears his name is constructed on the principle of a round-wicked lamp.

Air comes up the hollow core as well as on the outside and produces active combustion with intense heat.

See CHEMISTRY.

Bunt. See SMUT.

Bunting, a soft, light, plain-woven, wool textile dyed in solid colors. It is used to some extent as a dress fabric, but in this country it is employed chiefly in the manufacture of flags, signals, and pennants. Bunting was first manufactured in the United States about 1864. See FLAG.

Bunyan, John (1628-1688), the author of *Pilgrim's Progress.* His father was an English tinker. He himself was taught to wander about mending the housewife's kettles and pans, sleeping in

hedges, and spending his pennies at low taverns. According to his own story, told in *Grace Abounding to the Chief of Sinners,* he was so profane that even hardened sinners were shocked. He was so notorious a drunkard that his presence was not desired even in dramshops. He married a pious Baptist woman, was converted, and, though ignorant, turned the talents he possessed for wickedness into exhorting sinners to turn from their evil ways. He became a noted revivalist. Thousands crowded to hear him preach of wrath and salvation. His preaching drew from the attendance at the established churches and he was thrown into Bedford jail as a disturber of the peace.

While lying in jail he wrote an allegory called *The Pilgrim's Progress from This World to That Which is to Come.* Christian is an anguished dweller in the City of Destruction. Evangelist warns him to flee. "Now he had run from his own door, but his wife and children perceiving it, began to cry after him to return; but the man put his fingers in his ears, and ran on, crying, 'Life! life! eternal life!'" Pliable runs with him, but turns aside and sinks in the Slough of Despond. Worldly Wiseman tells Christian he is a fool and turns him aside among burning mountains. Evangelist reappears and points out the Straight Gate. Interpreter shows him the way to the Celestial City. He climbs the Hill of Difficulty, is entertained by Watchful and his daughters, Piety and Prudence. His passage through the Valley of Humiliation is won after a hard fight with Apollyon. Unseen monsters terrify in the Valley of the Shadow of Death. Vanity Fair with its buyers and sellers spreads a net of attractions for the weak. Faithful, his companion, is taken and bound at the stake. Christian going onward joins another friend, Hopeful, but turning from the straight and narrow road into a pleasant bypath through a meadow, is taken with his companion by Giant Despair and thrown into Doubting Castle. A key called Promise liberates them from the Dungeon, and the old giant is seized by rheumatism so that he cannot follow them. In the Delectable Mountains they see the Celestial City. The fogs and briers of Enchanted Ground and Beulah Land, with its flowers and songs of birds, bring them to the black, cold river which all must cross. Faith sustains them in its dark billows. A company in white and shining raiment with trumpets in their hands receive them on the other shore and crying, "Holy, holy, holy is the Lord," convey them to the fair city with streets of gold, and into the presence of the King, "which when I had seen, I wished myself among them," concludes Bunyan.

Later he wrote an account of Christiana, the wife, and her children who followed Christian to the Celestial City; but by that time the dangers of the trip had been abated and the journey is not so full of incident and fighting.

Ninety-three per cent of the words in *Pilgrim's Progress* are short, terse, Anglo-Saxon words such as Bunyan learned from his Bible. This allegory, written by a tinker preacher in a jail, is second only to the Bible in its influence on English-speaking people. The characters are such as may be found in any parish. Lord Hate-Good, the vile judge of Vanity Fair, is understood to be the infamous Lord Jeffreys who conducted the Bloody Assizes. A hundred thousand copies of the *Pilgrim's Progress* were printed during the author's lifetime. American colonists brought it with them to America. It has been translated into almost as many languages as the Scriptures. The omission of a few pages relative to old time persecution of heretics makes the book equally acceptable to Protestants and Catholics.

In his *Essay on Bunyan,* Macaulay concludes:

> Though there were many clever men in England during the latter half of the seventeenth century, there were only two minds which possessed the imaginative faculty in a very eminent degree. One of those minds produced the *Paradise Lost,* the other the *Pilgrim's Progress.*

Of his own work Bunyan wrote:

> Would'st read thyself, and read thou know'st not what,
> Oh, then come hither
> And lay my book thy head and heart together.

Buoy, boi, in navigation, any float designed to indicate a rock, shallow, or channel. A row of buoys may be anchored along either side of a channel leading amid rocks or shallows to a harbor, in which case those of one series are painted usually of a color strongly contrasting with that of the other series. A pilot is assisted by knowing that he must steer, for instance, to the right of all red buoys and to the left of all black ones. When proceeding up stream or toward the head of a harbor or estuary, the pilot leaves flat-topped buoys on the port hand and conical-shaped buoys on the starboard hand. Spherical buoys indicate a shallow with a channel on each side. Bell buoys carry a bell rung by the heaving of the waves. Lamps and even electric lights, in a shore circuit, of course, are employed to render buoys visible at night. A life buoy is a life preserver, made usually of first crop cork covered with painted canvas. It is made in the form of a belt and is designed to surround the body below the armpits, and keep a person afloat till boats can reach him. Ships are required by law to carry life buoys accessible in case of disaster.

Burbank, Luther, an American horticulturist. He was born at Lancaster, Massachusetts, March 7, 1849. He was reared on a farm. He labored four years to develop a smooth, mealy, good-sized potato, one reasonably free from insect plagues. The Burbank potato was the result. With means obtained from selling seed potatoes, in 1875 he opened an experimental farm at Santa Rosa, California. He is the most distinguished American improver of fruits and vegetables. He has originated the Burbank potato, half a dozen valuable plums, three prunes, two choice callas, several roses, and a number of new varieties of apples, peaches, nuts, flowers and vegetables, and produced the spineless cactus. Seemingly nothing is beyond his skill. He has even developed a white blackberry, to which he has given the name of the iceberg. Wonders are expected of a spineless cactus which, it is hoped may prove a suitable plant for cattle on the arid plain.

Burbank's general plan of work is to hasten the process of evolution by supplying conditions as to fertility, heat, and moisture that will bring on changes more rapidly than nature would do. Of ten thousand plants, he selects a few and destroys the rest. Of many thousand descendants of these plants, he destroys all but a few and so on. Starting with a red poppy that shows a spot of yellow, he raised a plot of poppies. A few showed yellow. These he cared for and destroyed the others. Seeds from these produced a plot of poppies showing more yellow. He saved the best and destroyed the rest, until he had a variety of yellow poppies with blossoms six inches in diameter coming true from the seed. He is called the wizard of horticulture, but he resents the name, as he relies on skill, judgment, and patience, not on magic. He adopts and hastens nature's ways. See MUTATION.

Mr. Burbank has made no effort to make money out of his new varieties. He is too busy for that. He says his time is worth $250 an hour to the world. In a money sense, he has remained a poor man. The Carnegie Institute, however, has placed $100,000, or $10,000 a year for ten years, at his disposal, so that he is now in the very joy of carrying on his work with no lack of means. He says of his own work:

> One more grain to the head of wheat, rye, barley, oats or rice; one more kernel of corn to the ear; one more potato to the hill or peach, pear, plum, orange, or nut to the tree would add millions of bushels to the world's food supply, millions of dollars to the world's wealth, not for one year only but as a permanent legacy. That is what I am trying to do.
>
> I have here a plant school to suppress the bad and develop the good qualities of flowers, fruits, and all useful plants. I give them everything they need as a wise mother does to children—the right conditions of soil and climate and food—fertilizer. I keep the evil away, sterilizing the soil and water as you sterilize milk for infants. It takes ten generations, sometimes, for a plant to overcome a hereditary fault but the work is always rewarded in the end, and the world is the richer.

There are other plant breeders, but Luther Burbank stands alone. He is a private person pursuing his own work in his own way and because he loves it so well that he cannot forego it. He is a gardener of a new kind. Every plant appeals to him. . . . Mr. Burbank is a

plain, modest, sympathetic, single-minded man. He is not a wizard. Luther Burbank stands for a great new idea in American horticulture. It is time we begin to recognize what this is. . . . He is a master worker in making plants to vary. Plants are plastic material in his hands. He is demonstrating what can be done. He is setting new ideals and novel problems. Heretofore gardeners and horticulturists have grown plants because they are useful or beautiful. Mr. Burbank grows them because he can make them take on new forms. This is a new kind of pleasure to be gotten from gardening, a new and captivating purpose in plant growing. It is a new reason for associating with plants. It is of little consequence to me whether he produces good commercial varieties or not. He has a sphere of his own and one that should appeal to a universal constituency. In this way, Luther Burbank's work is a contribution to the satisfaction of the living and is beyond all price.—L. H. Bailey, *Plant Breeding.*

Burdett-Coutts, bûr-dĕt-kōōts′, **Angela Georgina, Baroness** (1814-1907), an English philanthropist. She was the daughter of Sir Thomas Burdett, a parliamentarian of note, and the granddaughter of Thomas Coutts, a London banker. While still a girl, she inherited immense wealth which she used in public and private charities so freely and yet wisely that she won the love of those whom she benefited and the admiration and respect of all. Angela Burdett built the first institutional church, St. Stephens, at a cost of four hundred and sixty thousand dollars. Other works followed, all of which had for their object the relief of suffering, the betterment of the people. She was made a baroness by Queen Victoria in 1871, and added her grandfather's name of Coutts to her own name of Burdett. Her influence was thus increased and she used it to procure laws to protect children and animals from cruelty and to insure health by better sanitation. In 1882 she married her private secretary, W. L. Ashmead Bartlett, who took her name and aided her in her efforts for good. She lived to be ninety-three years of age, but will be long remembered as an example of what an unselfish life may accomplish.

Burdette, Robert Jones (1844-1914), an American humorist. He was born at Gainsborough, Pennsylvania. He served in the Union army during the Civil War, and began newspaper work soon after. In 1874 he became associate editor of the Burlington (Iowa) *Hawkeye.* Later he received license to preach as a Baptist clergyman. Burdette is known as a humorous lecturer, possessing in large measure the gift of swaying the emotions of his audience. There is a simple freshness in his writings that is delightful. His humor is peculiarly his own, and, while very unpretentious, possesses a quality which never wearies but invites to read and read again. Some of his articles were collected and published in book form in 1877, under the title of *Hawkeytems.* Other writings are *Life of William Penn, Chimes from a Jester's Bells,* and *Rise and Fall of the Moustache.* Mr. Burdette is also the author of a number of poems.

Burdock, a despised weed. It is a member of the composite family, and is related to the thistles. The flowers and seeds are inclosed in a bur-like involucre, whence, no doubt, the name. The scales of the bur-like head are armed with curved prickles, by means of which children at play hook burdock heads together to form necklaces. "Burdocks are great travelers." The burs fasten themselves into the wool, fur, and hair of animals and are distributed. A cow's tail is not infrequently matted with such burs, and the same may be said of a sheep's fleece. Small birds are sometimes entangled by the strongly hooked burs. Instances are on record of a humming bird and of a goldfinch coming to an untimely end in this way. The Japanese are said to have improved the burdock by cultivation until its root is a prized garden vegetable. Burdock root is an old-fashioned remedy used to "cleanse the system,"—a rival of sarsaparilla. About 50,000 pounds of Belgian burdock root are imported yearly by American druggists. The fresh leaves, also, make a grateful, cooling poultice for certain swellings and ulcers.

Burglary, in law, the breaking and entering the house of another with intent to commit a crime, particularly to steal. In a wider sense the term applies to the criminal entry of any building. The penalty is usually from five to ten years' imprisonment. North Carolina makes burglary

BURBANK AND HIS WORK

1. Walnut Tree and Fruit.
2. Cherry with pit remaining on stem.
3. Amaryllis.
4. Poppy.
5. Iris.
6. Everlasting.
7. Rose.
8. Calla.
9. Shasta Daisy.
10. White Blackberry.
11. Thornless Raspberry.
12. Quince.
13. Stoneless Prune.
14. Apple-Plum.
15. Apples.
16. Burbank Potato.
17. Ordinary Thorny Cactus.
18. Thornless Cactus with fruit—Prickly pear.

punishable by imprisonment or death. The slightest breakage, as of a window pane, or the removal of the smallest portion of the house, with evident intent to enter, constitutes an act of burglary. The forcible entrance of a foot or hand is likewkise proof of intent to commit burglary. See ARSON.

Burgoyne, bûr-goin′, **John** (1723-1792). An English soldier. He came of a good family and secured influence by marriage into a earl's family. He sat in Parliament, served in Portugal, and joined General Gage in Boston. He was an onlooker at the battle of Bunker Hill. In 1777 he conducted the ill-fated invasion of New York by way of Canada that ended in Burgoyne's surrender, whereby army stores, artillery, and 5,791 fighting men fell into the hands of the Americans. His courage has never been questioned, but the unfortunate end of the expedition, and its influence in encouraging the French to espouse the American cause, led to Burgoyne's neglect. He was refused an audience with the king and was denied a court-martial. He resigned from the army. He wrote plays for the stage and was one of the Parliamentary committee appointed to impeach Warren Hastings. Like many another luckless commander he continued to the end to lay the blame for his defeat on others. He wrote a book to show that the British cabinet was to blame for his defeat at Saratoga.

Burgundy, a province of France noted for its red wines. Historically Burgundy is the home of the Burgundians, a German people occupying the valleys of the Loire and the upper Rhone. The seat of the Burgundian kingdom was at Lyon or Geneva. The Burgundians were at war frequently with the Franks, and were several times subdued only to reassert their independence. Under Philip the Bold and Charles the Bold, extensive territory was acquired as far north as Holland. It was only shortly before the discovery of America that it was decided that France should absorb Burgundy, and not Burgundy, France. See FRANCE; CHAMPAGNE.

Burial of Moses, The, a well known poem by Mrs. Cecil Frances Alexander, an Irish poet who died in 1895. There are few poems in which the language and the metrical form are more appropriate to the emotions suggested. It is, therefore, a poem that will never cease to be read.

This was the truest warrior
  That ever buckled sword,—
This the most gifted poet
  That ever breathed a word;
And never earth's philosopher
  Traced with his golden pen,
On the deathless page, truths half so sage
  As he wrote down for men.
And had he not high honor—
  The hill-side for a pall,—
To lie in state while angels wait,
  With stars for tapers tall,—
And the dark rock-pines, like tossing plumes,
  Over his bier to wave,
And God's own hand in that lonely land,
  To lay him in the grave?

Burke, Edmund (1729-1797), a British statesman. He was a native of Ireland, and was educated at Trinity College, Dublin. He was prepared for the study of the law, but took up politics. At the age of thirty-five he entered Parliament, where he formed one of a group of orators. Chatham, Fox, Erskine, Pitt, Sheridan, Grattan, and Burke—they have not been equaled before or since, and, at the present distance, it is but fair to say that Burke was the greatest of them all.

He deprecated the course of Parliament in offending and alienating the American colonies. He was possessed of profound views of justice and fairness to all men. He told the members of Parliament that fair treatment,—such as in the twentieth century is accorded Canada and Australia,—would be satisfactory to the Americans and that they were entitled to simple justice. If Burke's views had prevailed with Parliament, the American Revolution would have been deferred; quite possibly it might not have occurred; we might have extinguished slavery without a civil war and be yet a member of the British Empire. Burke did not deny the right of Parliament to tax the colonies. He opposed various acts of Parliament as inexpedient. Burke's attitude may be seen from passages from his *Conciliation:*

I do not mean to commend either the spirit in this excess or the moral causes which produce it. Perhaps a more smooth and accommodating

spirit of freedom in them would be more acceptable to us. Perhaps ideas of liberty might be desired more reconcilable with an arbitrary and boundless authority. Perhaps we might wish the colonists to be persuaded that their liberty is more secure when held in trust for them by us, as their guardians during a perpetual minority, than with any part of it in their own hands. The question is not whether their spirit deserves praise or blame, but what, in the name of God, shall we do with it? . . . I do not know the method of drawing up an indictment against a whole people. . . . The colonies complain that they have not the characteristic mark and seal of British freedom. They complain that they are taxed in a Parliament in which they are not represented. If you mean to satisfy them at all, you must satisfy them with regard to this complaint. If you mean to please any people, you must give them the boon which they ask,—not what you may think better for them, but of a kind totally different. Such an act may be a wise regulation, but it is no concession; whereas our present theme is the mode of giving satisfaction. . . . My idea, therefore, without considering whether we yield as matter of right or grant as matter of favor, is to admit the people of our colonies into an interest in the Constitution.

Burke saw farther into the American future than the majority of his fellow members. He opposed the war with the American colonies as unwise, unnecessary, and suicidal. The American reader is likely to think that the mind of Edmund Burke was engrossed with American affairs. His interest in the colonies was indeed intense, but it was an interest in the effect that a false colonial policy might have on England herself. In his treatment of American topics Burke was farseeing and democratic beyond his day. He understood Americans because they were Englishmen. He understood the colonists because he conceived them to be like himself. He understood the people of the colonies because he understood the people of Chester, of Wales, of Scotland, and of Ireland.

In his treatment of French problems, however, Burke failed to understand that democracy is democracy in France as well as in England. Burke had opportunity to study the French Revolution close at hand. London was full of refugees. He had every chance to understand what was going on across the English Channel, and yet in *Reflections on the French Revolution,* written in 1790, he failed to interpret the spirit of democracy that moved the people of France. He denounced the wrongdoings of Hastings, the autocratic ruler of India, but he failed to get hold of the French situation. He attacked the French Revolution, he assailed its leaders, and he expressed a profound conviction that a flood of evils could not fail to flow from the adoption of the democratic and leveling ideas of the French popular leaders. Burke's early attitude was helpful to the cause of the common people; his later influence was exerted and was felt, too, in the opposite direction. The following sketch is taken from J. R. Green:

Burke had come to London in 1750 as a poor and unknown Irish adventurer. The learning which at once won him the friendship of Johnson, and the imaginative power which enabled him to give his learning a living shape, promised him a philosophical and literary career: but instinct drew Burke to politics; he became secretary to Lord Rockingham, and in 1765 entered Parliament under his patronage. His speeches on the Stamp Acts at once lifted him into fame. The heavy Quaker-like figure, the scratch wig, the round spectacles, the cumbrous roll of paper which loaded Burke's pocket, gave little promise of a great orator and less of the characteristics of his oratory—its passionate ardour, its poetic fancy, its amazing prodigality of resources; the dazzling succession in which irony, pathos, invective, tenderness, the most brilliant word-pictures, the coolest argument followed each other. It was an eloquence indeed of a wholly new order in English experience.

Burke's speech *On Conciliation with America,* and on *American Taxation* are read in American schools as specimens of British eloquence and for their historical value. Other works of importance are an *Essay on the Sublime and the Beautiful,* and the *French Revolution.* His greatest oratorical effort was the *Impeachment of Warren Hastings.* See HASTINGS.

Burlap, a heavy, coarse material, made of hemp or jute. It is used for wrapping furniture, for bagging, as a foundation for floor oil-cloth, and other purposes for which a strong but pliable cloth is needed. A rather better quality is dyed in solid colors, and is backed with sizing. It is used for wall coverings. Burlap is printed sometimes in ornamental designs. See JUTE; HEMP.

Burlesque, bûr-lĕsk′, a literary production which tends to excite laughter by an

exaggerated or ludicrous presentation of the peculiarities of some other work, or of some actual occurrence or condition. A burlesque is to drama what caricature is to art or to the serious business of life. The word is from the Italian *burla* meaning mockery. In its general use the word burlesque designates properly such works as Butler's *Hudibras,* Cervantes' *Don Quixote,* and many of the poems of Thomas Hood and of Oliver Wendell Holmes.

Burlesques have been known since the earliest beginnings of drama, many of the comedies of Aristophanes being of a burlesque character. The word is used in a somewhat narrower sense to designate a modern stage production which combines burlesque with vaudeville, and it has degenerated from comedy to farce. See ARISTOPHANES; VAUDEVILLE.

Burlingame, Anson (1820-1870), an American statesman and diplomatist, noted as the negotiator of the treaty between the United States and China, by which treaty the latter country first accepted the principles of international law. Mr. Burlingame was born at New Berlin, N. Y. He was graduated from the University of Michigan in 1841 and from Harvard Law School in 1846. For some years he practiced law in Boston, Mass. He served as a Congressman from 1854 to 1861. In 1861, Mr. Burlingame was sent as Minister to Austria, but the Austrian government would not accept him, owing to his advocacy of Hungarian independence. He was then sent as Minister to China, where he served until 1867. Having gained the confidence of the Chinese government, Mr. Burlingame was appointed Ambassador from China to the United States, and in 1868 concluded the famous Burlingame Treaty.

Burlington, Ia., the county seat of Des Moines Co., is 206 miles west-southwest of Chicago, on the west bank of the Mississippi River. Where the city stands a fur trading post was established in 1829. The first buildings of a real settlement were erected in 1833. It is the home of large machine and repair shops of the Chicago, Burlington & Quincy railroad. Chief among the products of its factories are furniture, mattresses, caskets and boilers. It contains a library, fine public schools and the Burlington College of Commerce. Population, in 1920, 24,057.

Burlington, a city of Vermont situated on Lake Champlain, and on the Rutland and the Central Vermont railroads. It is a city of beautiful situation, of wide and cleanly streets, handsome residences and fine public buildings, and of wide reputation for its educational, religious, and charitable institutions.

The excellent harbor makes the city an important lumber market, and its manufactures include lumber, stone and marble products, also cotton and woolen goods and proprietary medicines. Besides the University of Vermont and the State Agricultural College, there is a school for boys, called the Vermont Episcopal Institute, a girls' school called Bishop Hopkins Hall, and two commercial colleges. The public school system is of high standing. Other notable institutions are the Mary Fletcher Hospital and the Fletcher Free Library, now in a Carnegie building. The population in 1920 was 22,779.

Burma, a province of British India, including Upper Burma, Lower Burma, and the Shan States. The Bay of Bengal forms the southwestern and the southern boundary of the province. Tibet lies north; Yun-Nan, French Indo-China, and Siam east. It has an area of 231,000 square miles, and its population in 1921 was over 13,000,000. The country is hilly and mountainous, the greatest elevation being in the north, giving this part tion being in the north, giving this part of the province a climate temperate as compared with the torrid region of Lower Burma. Two rivers, the Irawadi and Salwin, with their numerous tributaries drain the land. The Irawadi is navigable for large steamers for a distance of seven hundred miles, and is the most important avenue of trade although several railroads traverse the province, and connect important towns. Agriculture is the leading industry, about nine million acres being devoted to the cultivation of rice. Other products are wheat, tea, cotton, sugar-cane, tobacco, and indigo. The only manufactures of importance are the weaving of silk, and cotton textiles.

Forests are extensive, teakwood, and bamboo being valuable products.

The natural resources of Burma include deposits of silver, lead, copper, iron, tin, amber, coal, and petroleum. Gold, sapphires, and rubies are found in certain parts.

The inhabitants are chiefly Buddhists, and are believed to have come into the country about two thousand years ago. Burma is now a Provincial Government, according to the Government of India Act of 1919, which went into effect in 1920-21, introducing many beneficial changes.

There were in 1919-20, 8,417 public schools and 18,389 private schools, with an enrollment, respectively, of 372,561 and 202,645 scholars. The expenditure on education in the same period for public schools was £14,889,696. Some 35 newspapers are published in Burma. The capital is Rangoon, where is located one of the three universities of India. Population, 1921, 339,527.

The soil is fertile, but comparatively a small portion is under cultivation. The main crop is rice, which occupies about 80 per cent of the cultivated area. Forests cover an area of 145,847 square miles, Burma having the largest extent of forests of any province of India. The most valuable tree, which is one of the principal exports of the country, is teak.

Burma is rich in mineral resources, especially petroleum. Almost the whole amount of petroleum extracted in India comes from this province. Burma is the chief source of the world's supply of wolfram, of which it produces about 5,000 tons a year. It also produces large quantities of tin.

The foreign trade of Burma is extensive. The chief ports are Rangoon, in Lower Burma, and Mandalay, in Upper Burma. The value of imports and exports is large.

The inhabitants belong to nine chief racial groups and have a variety of languages. The Burmese form more than two-thirds of the population. The chief languages are Burmese and Karen. The Burmese are much better educated than other natives of India, education being in the hands of the Buddhist monks.

Burne-Jones, Sir Edward (1833-1898), an English artist, noted especially for his figure paintings and his decorative designs. He was born at Birmingham. He attended Oxford University, but coming under the influence of Dante Gabriel Rossetti, gave up other education to devote himself to art. He is classed among the preraphaelites, although not a member of the Brotherhood of that name. He held, however, the same aims and the same ideals of art. Burne-Jones painted both in water-color and in oils, and his work is remarkable for the poetic feeling displayed in his conceptions and for richness and brilliancy of coloring. Among his best-known paintings are *Venus' Mirror, The Golden Stair, King Cophetua and the Beggar Maid,* and *The Annunciation.*

Burnett, Frances Hodgson (1849-), an English-American novelist. She was born in Manchester, England. While a young woman, she came to America, where she married Dr. S. M. Burnett. Divorced from him in 1898, she married Stephen Townsend, an English writer. Mrs. Burnett, as she is usually called, spends a part of each year in England, but most of her literary work has been done in the United States. Her first literary success was *That Lass o' Lowrie's,* which apeared serially in *Scribner's Magazine.* Her most famous story is *Little Lord Fauntleroy,* which has been very popular both in book form and as dramatized. Other novels are *Louisiana, Haworth's,* and *A Fair Barbarian. Sara Crewe* and *Little Saint Elizabeth* are stories of child life.

Burnham, Daniel Hudson (1846-1912), one of the most distinguished of American architects, was born at Henderson, N. Y. He was educated in Massachusetts and Chicago, and opened offices in Chicago in 1872. Mr. Burnham designed the Masonic Temple, the Great Northern Hotel, the Railway Exchange, and the Field department store, all in Chicago; the Flat Iron building in New York; the Selfridge department store in London; the Union Station in Washington, D. C.; and he and his partner, John W. Root, made the general plans of the Columbian Exposition at Chicago. In 1894, he was made president

of the American Institute of Architecture. Mr. Burnham made plans for rebuilding San Francisco; and the plan for the improvement of Chicago was one of his creations.

Burnham, Sherburne Wesley (1838-1921), an American astronomer, was born at Thetford, Vt. While working as a stenographer he studied astronomy; and when he became clerk of the United States Circuit Court, northern district of Illinois, he gained leisure for further study of the stars. In 1877, he became connected with the Chicago Observatory, then with the Lick Observatory, and was later made professor of practical astronomy at the Yerkes Observatory, at Williams Bay, Wis. He catalogued 1,274 new double stars. Mr. Burnham was made a fellow of the Royal Astronomical Society of England in 1894; and in the same year he received its gold medal for his measurement and discovery of double stars. In 1900, the Yerkes Observatory issued a catalogue of the stars discovered by Mr. Burnham. In 1904, he was awarded the Lalande prize of the Paris Academy of Sciences. He published also a catalogue of all known double stars visible in the Northern Hemisphere.

Burns, John, a London labor leader. He was born in 1858. His father was an engineer. He began work at the age of ten in a candle factory at the wage of twelve cents a day. Later, he served an apprenticeship in engineering. He became a labor leader and developed ability as an open air speaker. He joined the Socialists in 1883. In 1886 he was arrested for speaking in Hyde Park. On his release he made a speech which was printed under the title, "The Man with the Red Flag." November 13, 1887, Bloody Sunday, he broke through the police lines to speak in Trafalgar Square and was arrested again. In 1889 he became a member of the London Council, and in the same year he organized and led the famous "Dock Strike." In 1892 he was elected to Parliament by a workingmen's district in London. In 1905 he entered the Liberal cabinet organized by Mr. Campbell-Bannermann. Mr. Burns was the first English workingman to hold a cabinet office. In this position he is known as the Right Honorable John Burns, and receives a salary of $10,000 a year. He still remains a member of the Union of Amalgamated Engineers. He is a total abstainer, a man of unimpeached integrity. Mr. Burns dresses, of course, like any other professional man. When he attends a royal reception he wears the garb prescribed for the occasion and is a man of commanding appearance, but no one could mistake him for an imitation of aristocracy.

To look down from one of the galleries on John Burns sitting on the Treasury bench is to see apparently an old man. The hair is almost snow-white; the forehead pale, spreading, and deeply lined; his movements as he adjusts his eyeglasses and reads over his official papers are leisurely and might even seem fatigued. But wait a moment. Wait till he lifts his face and you catch a glimpse of his great, brown, clear, burning eyes. Or wait till he rises to address the House, electrical alertness speaking from every gesture, from the very poise of the body, power and passion in his voice, his whole bearing eager, defiant, welcoming the combat. Or see him again on the Terrace outside—a thick, square man, in a blue reefer suit, his head thrown massively back, tramping up and down with free and swinging stride. You would not then think him old. Still less would you think so it you walked with him through the streets or parks, among his own people, giving and exchanging salutations, patting a youngster on the head, helping to fish out a ball that has fallen into the Serpentine, showing a boy how to handle a cricket-bat, skipping over the ropes with the girls, congratulating the mothers, jesting with the policemen, the very picture of zest, health, and jollity. The workmen know him and love him. They recognize in him the biggest man that their class in England has yet produced. And John Burns knows them and loves them in return, and uses both his knowledge and his affection to rebuke, chastise them, and make them elevate themselves. Himself a non-smoker and a total abstainer, he never shirks from rubbing in his conviction that there is little the government can do for the workingman compared with what the workingman can do for himself. No man has spoken out more strongly against drink and betting. No man has insisted more trenchantly that social and industrial reform must begin with the individual.

It is here where he parts company with Mr. Keir Hardie and his followers. They are Socialists, look to the state for everything, proclaim it as a natural right of every man to have remunerative work found for him, and are swiftly, as it seems to me, rousing the laboring classes to a very ugly mood. John Burns hates nothing so much as the thought of the English workingman becoming a prey to cringing, shirking pau-

perization. John Burns wishes to see the workingman brave, upright, and above all, independent. From the very first he has had the profoundest contempt for the charity-mongers, vicarious philanthropists whose policy of spoon-feeding the unemployed ends, as he says, "in the demoralization of the donors and the degradation of the recipient."—Sydney Brooks in *Harper's Weekly*.

Burns, Robert (1759-1796), a Scottish poet. He was born January 25, 1759, in an "auld clay biggin," or cottage, about two miles south of Ayr. His father was a tenant farmer of intelligence and small means, but desirous that his children should have an educated understanding. The father's portrait is drawn for us in the *Cotter's Saturday Night*. Burns's school education consisted of reading, writing, grammar, and arithmetic, and later of a little geometry and less Latin and French. The Burns family was neither poorer nor richer than thousands of other families.

As soon as Robert was old enough he was needed to help with the work. The father was unfortunate in the management of a small farm, lost what little he had, and became unable to labor. Robert was the oldest boy and it fell on him to support the family. He got away for a short time now and then, once with a view to learn a trade; but settled down to ditch, plow, sow, reap, and flail. He was a strong, active fellow. He was not afraid of work, yet he longed to be a scholar. He felt at times that he was working like a galley slave. Seeing other young men with, as it seemed to him, a better chance, he felt

> It's hardly in a body's pow'r,
> To keep, at times, frae being sour,
> To see how things are shar'd.

He did not realize that the education of the schools and the good things of life would have cut him off from writing the poems of the people which have made him famous. In fact, his best writing was done in the years when he was working hard all day. His brother tells us that Robert climbed to a garret at night where he kept his writing material to write the thoughts that had occurred to him as he followed the plow. His lines *To a Mountain Daisy* beginning,

> Wee, modest, crimson-tipped flower,
> Thou's met me in an evil hour;
> For I maun crush among the stoure
> Thy slender stem:
> To spare thee now is past my power,
> Thou bonny gem.

were written in this way. Only one himself in hard circumstances, and who had himself turned up a mouse's nest with a plow, could have written:

> That wee bit heap o' leaves and stibble
> Has cost thee mony a weary nibble!
> Now thou's turn'd out for a' thy trouble
> But house or hauld,
> To thole the winter's sleety dribble,
> And cranreuch cauld!
>
> But, Mousie, thou art no thy lane,
> In proving foresight may be vain:
> The best laid schemes o' mice and men
> Gang aft a-gley,
> And lea'e us nought but grief and pain
> For promised joy.

We may add only such can appreciate the poem to the full. Burns's very power lies in the fact that he is a plowman speaking to plowmen. Scotland is a great country for folk songs. Burns was intensely fond of repeating them. To become a poet was his ambition. Writing of his youth to a friend of his maturer years, he says:

> Even then a wish (I mind its power)
> A wish that, to my latest hour,
> Shall strongly heave my breast—
> That I, for poor auld Scotland's sake,
> Some useful plan or beuk could make,
> Or sing a sang at least.

As to his style of writing we can say only that the songs of the countryside were at his tongue's end. He repeated them and sang them until the thoughts in his own mind ran into them like molds. He followed the old meters and rhymes, and not infrequently he used many of the words. One who is familiar with Scottish songs can recognize their influence readily.

After a number of his poems had been circulated in a small way among friends, Burns decided to print them, which he did in a small volume known from the place of publication as the Kilmarnock edition of 1786. The paper was poor and the binding worse; but the volume brought the author fame and a few guineas. Copies are now among the treasures of libraries and book collectors. The original price

was three shillings. A copy sold recently for $2,860 at an auction of rare books.

Burns had had thoughts of going to Jamaica where a living could be made more easily, but the sale of his little book put that out of his mind. He visited Edinburgh, where his personality and appearance, wit and independence of speech, as well as the character of his poems, made him the lion of the hour. His conversation was as refreshing in the conventional society of the drawing room as a whiff of air from the mountains. A subscription to a new edition was taken up by an association known as the Caledonian Hunt, and Burns returned home feeling that he had won a place in the world's notice.

It would seem that one who had risen thus far would rise higher, but Burns had weaknesses in his character. For one thing he was enamored of many women. Some he treated well; others he treated ill. He was handsome, vain, and weak, but appears to have had a high ideal. The woman of Burns's songs is superior. We give two quotations. The first was inspired by Handsome Nell, a boyhood friend. It was written when he was seventeen; the second is from his *Address to Mary in Heaven,* a poem inspired by the death of Highland Mary to whom he appears to have been sincerely attached:

She dresses aye sae clean and neat,
Both modest and genteel;
And then there's something in her gait
Gars ony dress look weel.

O, Mary! dear departed shade!
Where is thy place of blissful rest?
See'st thou thy lover lowly laid?
Hear'st thou the groans that rend his breast?

That sacred hour can I forget?
Can I forget the hallow'd grove,
Where by the winding Ayr we met,
To live one day of parting love?

Eternity cannot efface
Those records dear of transports past,
Thy image at our last embrace—
Ah! little thought we 't was our last!

From the edition for which arrangements were made in Edinburgh, Burns realized $2,500. With this sum in hand he rented and stocked a farm and married Jean Armour, one of the young women with whom he was entangled. It would be pleasant to record a life of industry and respectability, but the truth is otherwise. His farming Burns never made pay. He spent much time at the public house. The drink habit grew upon him. He was fond of convivial gatherings and tavern cronies that did him no good. Some of his carousing songs are otherwise among his best efforts. The quotation is from *O, Willie Brew'd a Peck o' Maut:*

O, Willie brew'd a peck o' maut,
And Rob and Allan cam to pree;
Three blyther hearts, that lee-long night,
Ye wad na fand in Christendie.
Cho. We are na fou, we're no that fou,
But just a drappie in our e'e;
The cock may craw, the day may daw
And aye we'll taste the barley bree.

Burns was in a tilt every now and again with the elders of the parish, that is to say, the Presbyterian church. He accused them of hypocrisy, and wrote several poems that were far from complimentary. His real attitude toward religious matters may be known from the *Cotter's Saturday Night,* and are well expressed in the following lines from his *Epistle to a Young Friend:*

The great Creator to revere,
Must sure become the creature;
But still the preaching cant forbear,
And ev'n the rigid feature:
Yet ne'er with wits profane to range,
Be complaisance extended;
An atheist laugh 's a poor exchange
For Deity offended.

Failing in farming, Burns secured a petty appointment from the London government as a collector of excise. In his *Essay on Burns* Carlyle, one of the few writers who understood the Scottish poet, grows indignant that mankind should permit a genius to go sizing up the brew of housewives and collecting the few pennies due the government on every making of ale. Burns himself writes a humorous poem on the duties of the exciseman.

To the poems already mentioned we must add *Tam o' Shanter, The Jolly Beggars, Bonnie Doon, Auld Lang Syne, A Man's a Man for a' That, Address to the Deil, Hallowe'en, The Farmer's Salutation to his Auld Mare, The Brigs of Ayr, To a Louse, To the Toothache,* etc.

In the later and inglorious part of his

life Burns did some excellent writing; but his habits were such that he was shunned by reputable society, even in the small town of Dumfries where he lived. He became so reduced in circumstances that he was by no means free from danger of imprisonment for debt. His constitution was undermined by work, worry, drink, and despair. He died, July 21, 1796, at the early age of thirty-seven. He was no sooner dead than Scotland realized its loss. A memorial was erected in the churchyard of Dumfries. A subscription edition of his life and works placed the family above want. As the years go by, his faults have been overlooked more and more, as if his *Advice to the Unco Guid* were an appeal to posterity:

Then gently scan your brother man
  Still gentler sister woman;
Tho' they may gang a kennin wrang,
  To step aside is human:
One point must still be greatly dark,
  The moving *why* they do it;
And just as lamely can ye mark,
  How far, perhaps, they rue it.

Burns was rarely gifted. He struggled to make something of himself, but was after all as nature made him. Because he could not write the verse of Pope and Milton, he feared he was a failure. Burns sang not of warlike deeds, nor of far away subjects, but of the homely topics that appeal to all. No other ever interpreted the feelings of the people more truly. No other writer of his century has so strong a hold on the affections of the world.

Burns is termed variously "the ploughman poet," "the Ayrshire ploughman," "the Bard of Ayrshire," and "the Peasant." No one would think of saying Harry Longfellow or Jack Whittier, but to the Scotch Burns is just Bobbie Burns, and that tells the whole story.

See AYR; DUMFRIES.

He spoke of Burns: men rude and rough
  Pressed round to hear the praise of one
Whose heart was made of manly, simple stuff,
  As homespun as their own.
  And when he read, they forward leaned,
  Drinking with thirsty hearts and ears,
His brook-like songs whom glory never weaned
  From humble smiles and tears.
—Lowell, *An Incident in a Railroad Car.*

Wild heather-bells and Robert Burns!
  The moorland flower and peasant!
How, at their mention, memory turns
  Her pages old and pleasant!
Give lettered pomp to teeth of Time,
  So "Bonnie Doon" but tarry;
Blot out the Epic's stately rhyme,
  But spare his Highland Mary!
—Whittier, *Burns.*

He owes no honor to the subjects, which his muse selected, for they are ordinary, and such as would have tempted no poet, save himself, to sing about.—Allan Cunningham.

Burns is by far the greatest poet that ever sprung from the bosom of the people and lived and died in an humble condition.—Professor Wilson.

O he was a good-looking fine fellow!—he was that; rather black an' ill-colored; but he couldna help that, ye ken. He was a strong, manly-looking chap; nane o' your skilpit milk-and-water dandies: but a sterling, substantial fellow, who wadna hae feared the deil suppose he had met him. An' then siccan an ee he had!—Memoir of Burns.

His person was strong and robust, his manners rustic, not clownish; a sort of dignified plainness and simplicity which received part of its effect perhaps from one's knowledge of his extraordinary talents. . . . I think his countenance was more massive than it looks in any of the portraits. . . . There was a strong expression of sense and shrewdness in all his lineaments; the eye alone, I think, indicated the poetical temperament. It was large and of a dark cast, and glowed (I say literally glowed) when he spoke with feeling or interest. I never saw such another eye in a human head, though I have seen the most distinguished men in my time. His conversation expressed perfect self-confidence without the slightest presumption.—Sir Walter Scott.

None but the most narrow-minded bigots think of his errors and frailties but with sympathy and indulgence; none but the blindest enthusiasts can deny their existence.—James Hogg.

It needs no effort of the imagination to conceive what the sensation of an isolated set of scholars (almost all either clergymen or professors) must have been in the presence of this big-boned, black-browed, brawny stranger, with his great flashing eyes, who, having forced his way among them from the plough-tail, at a single stride, manifested in the whole strain of his bearing and conversation, a most thorough conviction that in the society of the most eminent men of his nation, he was exactly where he was entitled to be; hardly deigned to flatter them by exhibiting even an occasional symptom of being flattered by their notice; by turns calmly measured himself against the most cultivated understandings of his time, in discussion; overpowered the *bon mots* of the most celebrated convivialists by broad floods of merriment, impreg-

nated with all the burning life of genius; astounded bosoms habitually enveloped in the thrice-piled folds of social reserve, by compelling them to tremble—nay, to tremble visibly—beneath the fearless touch of natural pathos.—Lockhart.

Burnside, Ambrose E. (1824-1881), an American soldier. He was born at Liberty, Indiana, and was educated at West Point. In the Civil War he was at Bull Run, South Mountain, and Antietam. In the autumn of 1862 he was appointed to supersede General McClellan in command of the Army of the Potomac. December 13th he was worsted by General Lee, and lost 10,000 men in the battle of Fredericksburg. Restored to a subordinate position, he fought with Grant at the Wilderness and Cold Harbor. After the war he was elected governor of Rhode Island and served that state in the United States Senate.

Burr, Aaron (1756-1836), an American politician. His father was an eminent Presbyterian clergyman and was for a short time president of Princeton College, now University, from which the son was graduated in 1772. His mother was a daughter of the celebrated Jonathan Edwards. Aaron is cited as an example of unaccountable moral degeneracy. In the Revolutionary War he joined the Continental forces before Boston, and took part in the assault on Quebec. Later he joined the Lee and Gates faction against Washington. At the close of the war he married a wealthy widow, and engaged in the practice of law in New York City. He rose rapidly in politics until he reached the United States Senate. Washington refused to appoint him minister to France.

When the presidential election of 1800 drew near, the Federalist members of Congress met in caucus and nominated John Adams and C. C. Pinckney of South Carolina. The Democratic-Republican members in like manner nominated Thomas Jefferson for the presidency and Aaron Burr for vice-president. The election went against the Federalists 73 to 65. The constitution provided that each presidential elector should vote for two candidates:

> The person having the greatest number of votes shall be the president, if such number be a majority of the whole number of electors appointed; and if there be more than one who have such majority, and have an equal number of votes, then the House of Representatives shall immediately choose by ballot one of them for president. . . . But in choosing the president, the votes shall be taken by states, the representation from each state having one vote.

The Republican electors sitting far apart in their several states made the mistake of casting a solid vote for Burr. Jefferson and Burr received seventy-three votes each. This tie threw the election into the House of Representatives in which the Federalists controlled the majority of the states. As the constitution then stood the House had the power only to select one of the two men whose names were tied. The Federalists were barred from voting for Adams. All they could do was to decide between Jefferson and Burr. Burr and his friends were eager to betray Jefferson and make Burr president. They tried to form a coalition with the Federalists. The friends of Jefferson were furious. The Federalists were not partial to Jefferson, but they did not trust Burr. On the thirty-sixth ballot ten states voted for Jefferson; four voted for Burr and two states cast blank ballots. Jefferson, the undoubted choice of the people, so nearly lost the presidency that the manner of election was changed by the adoption of the Twelfth Amendment.

Burr served out his four years as vice-president, after which he ran for the governorship of New York and was defeated. Burr had always been a bitter opponent of Alexander Hamilton. He charged up his present defeat against Hamilton and drew him into a duel in which Hamilton was killed, July 11, 1804. Burr then went to the Ohio Valley and to the southwest. He was arrested on a charge of treason, his accusers claiming that he designed detaching the Mississippi Valley from the Union and erecting a new empire for his own benefit. He was discharged finally for want of proof, but henceforth he was a discredited man. Many doubt his treasonable purpose, but none hesitate to say that he was brilliant, unscrupulous, and dangerous.

In 1833 Burr married a second widow,

but the marriage was an unhappy one and they soon separated. Burr had but one child, a daughter, Theodosia. She kept house for her father in New York City until, in 1801, she married Governor Joseph Allston of South Carolina. In 1812 she sailed from Charleston on the ship Patriot for New York. The ship was never heard from. Some thought it had fallen into the hands of pirates, others that it foundered at sea.

See HAMILTON; BLENNERHASSET.

Burritt, Elihu (1810-1879), a New England reformer. A native of New Britain, Connecticut. He was the son of a shoemaker and learned the blacksmith's trade. An ambition to read the Scripture in the original tongues in which they were written led to prolonged study on his part, gaining for him the nickname of "The Learned Blacksmith." He removed his blacksmith shop to Worcester to be near a good library. In 1846 he began to travel and lecture. He visited England and founded a society with a view to suppress warfare throughout the world. Mr. Burritt was an earnest advocate of a "High Court of Nations," an idea that has taken form in the Hague Tribunal. He also took hold of cheap postage as a means of increasing intelligence. He became an apostle of temperance as well as an anti-slavery writer and speaker. One of his books is entitled *Sparks from the Anvil.*

Burroughs, John (1837-1921), an American naturalist and author. He is Thoreau's most distinguished disciple. He was born at Roxbury, New York, a farmer's boy. He made and sold maple sugar to buy the books he longed for, but from which he learned less than from the outdoor world. He was successively a teacher, a journalist, a clerk in the treasury department, and a bank examiner. At last he returned to the life he loved, settling on a small farm in Esopus on the Hudson. Here he built a home suited to his tastes, gave it the beautiful name of "Riverby," and devoted his time to raising fruit and studying nature at first hand. A footpath leads over the hills from "Riverby" to "Slabsides," a rustic study built in the woods. Here Mr. Burroughs did his literary work. Occasionally he left home and farm for the city, but says: "Three or four days in the city is about all I can stand at a time." Mr. Burroughs' books include *Wake Robin, Winter Sunshine, Locusts and Wild Honey, Indoor Studies, Walt Whitman—A Study, Signs and Seasons, Fresh Fields.*

It seems natural to compare Burroughs with Thoreau. Hamilton Wright Mabie says: "Of the two, Thoreau had the more thorough formal education; but Burroughs shows keener susceptibility to formative influences of all kinds. Thoreau had the harder mind, the nature of greater resisting power. Burroughs is more sensitive to the atmosphere of his time. . . . He had the more open mind, the quicker sympathies, the wider range." Katherine Lee Bates writes: "Thoreau saw natural phenomena with eyes that searched beyond, and he reported, after all, less of this world than of the other. Burroughs is a plainer man, who takes warblers and hemlocks at their surface value and makes literature out of a cow."

He is often at "Slabsides"—sometimes for weeks or months at a time, though he always makes daily visits to the valley to look after the work in his vineyards and to visit the post-office at the railway station. He is a leisurely man, to whom haste and the nervous pursuit of wealth or fame are totally foreign. He thoroughly enjoys country loitering and when he gets a hint of anything interesting or new going on among the birds and little creatures of the fields, he likes to stop and investigate. His ears are remarkably quick and his eyes and sense of smell phenomenally acute, and much which to most of us would be unperceived or meaningless he reads as if it were an open book. Best of all, he has the power of imparting his enjoyment, and what he writes is full of outdoor fragrance, racy, piquant, and individual. His snap and vivacity are wholly unartificial. They are a part of the man—a man full of imagination and sensitiveness, a philosopher, a humorist, a hater of shams and pretension. The tenor of his life changes little from year to year, his affections remain steadfast, and this hardy, gray poet of things rural will continue, as ever, the warm-hearted nature enthusiast, and inspirer of the love of nature in others.—Clifton Johnson.

QUOTATIONS FROM BURROUGHS.

No one starts in the study of natural history with such advantages as he whose youth was passed on the farm. He has already got a great deal of it in his blood and bones; he

has grown up in right relations with man and beast; the study comes easy and natural to him.

You must have the bird in your heart before you can find it in the bush.

Burton, Robert (1577-1640), an English clergyman. He spent his life in study and the writing of one book, *The Anatomy of Melancholy*. He was educated at Oxford and was appointed fellow at the age of twenty-two. From that time he lived in libraries. He says of himself, "I have read many books, but to little purpose, for want of good method. I have confusedly tumbled over divers authors in our libraries with small profit, for want of art, order, memory, judgment." See ANATOMY OF MELANCHOLY.

Doctor and poet, man of letters and savant, he is all at once; for want of dams, ideas pour like different liquids into the same vat, with strange spluttering and bubbling, with an unsavory smell and odd effect.—Taine.

That fantastic great old man.—Lamb.

To whom melancholy gave life and death.—Epitaph by Burton himself.

Bushel, a dry measure. The United States government has sent a standard set of dry measures to each state. A bushel contains four pecks or eight gallons. Abbreviation, *bu.* or *bush.* The capacity of our bushel measure is 2150.42 cubic inches. It is based on the old English Winchester bushel, so called from the fact that the ancient standard bushel measure of England was preserved in the old town hall of Winchester. It is not a scientific measure. It happens to be the volume of a cylinder 18½ inches in inside measure and 8 inches in depth. It holds 77.6274 pounds of distilled water at 39.8° F. under 30 inches atmospheric pressure. In 1826, to correct various local bushels in use, the British Parliament adopted or legalized a standard imperial bushel which holds 80 pounds avoirdupois of distilled water at the temperature of 62° F. under a barometric pressure of 30 inches. Its capacity is 2,218.192 cubic inches. Americans adhere, however, to the Winchester bushel.

Where no contract exists to the contrary, a bushel by weight is required by law. As a measure of weight, the states have adopted various standards, which in the majority of cases, however, are as follows, the figures indicating the number of pounds to the bushel:

Wheat	60	Beets	60
Rye	56	Beans	60
Oats	32	Peas	60
Barley	48	Apples	50
Buckwheat	50	Dried apples	28
Shelled corn	56	Dried peaches	33
Corn on cob	70	Flaxseed	56
Corn and Rye meal	50	Hempseed	44
Bran	20	Milletseed	50
Potatoes	60	Timothy seed	45
Sweet potatoes	60	Bluegrass	14
Carrots	55	Hungarian	50
Turnips	60	Cloverseed	60

Bushmen, an African tribe inhabiting the northwesterly portion of Cape Colony. Unlike their neighbors, the tall Hottentots, to whom they are akin, the Bushmen are of low stature, almost dwarfs in fact. Their complexion is of a dirty yellowish color. When found by the white people, they lived largely on roots and herbs. They slept in caves or in rudely constructed stick houses in the copse or bush, whence the name. They were without fixed homes, and had no domestic animals. Their language is "half way between that of a man and a monkey." The Bushmen are considered among the most degraded human creatures on the face of the earth. They are disappearing before the advances of the white settlers.

Bushrangers, Australian desperadoes. Portions of Australia are covered by an almost impenetrable growth of copse-wood called locally the bush. The earliest settlers were criminals deported from England for life or for a term of years. As the country filled up with actual settlers and gold mines were worked, gangs of thieves and desperate characters recruited from the dregs of the convicts took to the bush and terrorized the settlers with their thefts, highway robberies, and bank raids. They were suppressed gradually by the Australian constabulary, and live now only in the yellow-backed novel for which they have furnished a fertile theme.

Bushwhackers, a term applied during the Civil War to loose, irregular characters, particularly of the southwest. When at home they professed to be neutrals, sympathizing with neither army. As a mat-

ter of practice, they hid away in ambush and shot passing soldiers, or, like ordinary bandits, held up travelers for their valuables. It is difficult to draw the line between a bushwhacker, a guerilla, and a highwayman.

Business College, or **Commercial College,** a school in which students are trained to fill various positions in offices and business houses. The subjects of primary importance are bookkeeping, stenography, and typewriting, but the better business colleges offer courses in geography, the history of commerce, office methods, commerical law, banking, grammar, composition, and often German or Spanish. The business college undertakes also to place its graduates in suitable positions. So far as is known the modern business college in the United States had its origin in the work of R. M. Bartlett, who in 1846 opened in Cincinnati a private school for the purpose of teaching bookkeeping and similar subjects. Business colleges are private institutions but many public high schools and colleges offer a commercial course, including instruction on the typewriter.

Bustard, bŭs′terd, a family of game birds, somewhat resembling the turkey in appearance, but classified between the plover and the crane. There are several species, found throughout Africa, about the Mediterranean, and eastward in southern Asia, as far as Japan. The common bustard ranges along the northern shore of the Mediterranean and as far east as the open steppes of Tartary. It haunts inland plains and desert regions. It has strong, naked legs and feet and is a good flyer. It is a handsome bird with ornamental chestnut plumage, varied with black and white, and is not unlike a grouse in habits. The great bustard attains a weight of thirty pounds. An allied species is the so-called wild turkey of New South Wales. Bustards were at one time numerous in Yorkshire and on Salisbury Plain, but the last English birds were seen about 1838.

Butcher Bird. See SHRIKE.

Butler, Benjamin Franklin (1818-1893), an American lawyer, soldier, and statesman. He was a native of Deerfield, New Hampshire, and was graduated at Waterville College, Maine, in 1838. He wrote his own autobiography and reminiscences in 1892. He practiced law at Lowell, Massachusetts. He won a case for a factory girl who brought suit against one of the large cotton mill corporations. Fearing an appeal and the consequent delay, which would be quite as vexatious for the girl as losing her case, Butler attached an indispensable water wheel belonging to the firm, and placed it in charge of the sheriff. An immediate settlement of the case became thus of as much importance to the company as to his client. Later in life he defended Henry Ward Beecher in the famous suit brought by Theodore Tilton. In politics Butler was an ardent Democrat. He sided with the northern Democracy in the split at the Charleston Convention in 1860. During the Civil War Butler became a general. He held Baltimore, lost the battle of Big Bethel, and settled the question of what to do with slaves within the Union lines by coining the expression, "contraband of war." They were known as contrabands for some time. In 1862 he coöperated with Farragut in the capture of New Orleans, and was appointed commander in that city. Hearing that Union soldiers were annoyed by the spiteful remarks of women, who relied upon their sex for protection, he issued an order that any women insulting Northern soldiers with remarks should be "treated as women of the town." In this way he brought upon himself the undying hatred of Southern society women, who believed nothing too base or mean for one whom they accused even of stealing spoons. At the close of the war Butler appeared in politics as a Republican and represented a Massachusetts district twice in Congress. He made four attempts to become the Republican governor of Massachusetts, and was finally elected in 1882 as a Democrat. Harvard University refused to confer the usual degree of LL. D. on him. In 1884 he was the candidate of the Greenback party for the presidency. He was a man of great vigor, and knew his own mind well; but

he was coarse fibered and lacked the refinement that marks the true gentleman.

Butler, Nicholas Murray (1862-), an American educator. He was born at Elizabeth, New Jersey. At the age of twenty he graduated from Columbia College, and then went abroad to study in Berlin and Paris. In 1885 he became instructor in philosophy in Columbia College, and has been associated ever since with that institution, now Columbia University. Upon the retirement of Seth Low to become mayor of New York City in 1902, Butler was made its president. President Butler is the editor of *The Educational Review,* and has made many contributions to educational periodicals. He is the author of *the Meaning of Education; Why Should We Change Our Form of Government?; What Is Progress in Politics?; The World in Ferment; Is America Worth Saving?, and Scholarship and Service.* Dr. Butler has also been prominent in politics, receiving the electoral vote of Utah and Vermont in 1912 for the office of Vice President of the United States, after the death of James S. Sherman. In 1923 he was president for the United States of *L'Association pour la Conciliation Internationale.*

Butler, Samuel (1612-1680), an English poet. He was educated in the classic learning of the day and held various petty official positions, none of which extricated him from genteel poverty. He is known chiefly as the author of *Hudibras,* a mock heroic poem ridiculing the Puritans. Hudibras is a sort of Don Quixote in verse. The poem was intended to please the gay and dissolute court of Charles II. "The best things have become proverbs. His mass of wit has been grated down into common speech, and particles of it may be found any day glittering in the talk of English plowmen and artisans." A few of these proverbial expressions are:

Make the fur fly.
Made his mouth to water.
Spick and span new.
Spare the rod and spoil the child.
Work before you rest.
Count their chickens ere they're hatched.
As ye sow, ye are like to reap.
True as the dial to the sun.
Look before you leap.
Shear swine, all cry and no wool.

Butte, a mining city of Montana, county-seat of Silverbow County and the largest city in the state. Butte is in one of the richest copper mining regions of the world, while there are gold and silver mines near by. The ores mined at Butte are smelted at Anaconda and Great Falls. The Montana School of Mines is located here, and there are fine public buildings, paved streets, electric lights, and an excellent street car system. The population of Butte, in 1920, that is of the municipality, was 41,611, but if its suburbs be included these figures are nearly doubled.

Butter, the fatty portion of milk. Freshly churned butter contains about 85 per cent of fat and 11 per cent of water. The remaining 4 per cent consists of curd, animal salt, a trace of sugar, etc. Historically, butter from the milk of the cow is quite modern. The first butter was made from the milk of the goat, reindeer, camel, and yak. A large part of the world has never seen butter of any kind. A very small portion is familiar with the butter made from the milk of the cow.

Homemade or dairy butter is produced by first setting the milk to cool in crocks or pans. The fat of milk is contained in small, oily globules much lighter than water. When milk stands, the heavier portion settles to the bottom of the pan, causing these globules of fat to rise to the surface where they may be skimmed off in the form of cream. Under the setting or gravity system it is claimed that from one per cent to one-half per cent of the cream remains in the skim milk of shallow pans, but that with cans twelve or eighteen inches deep, set in cool water, the remainder may be decreased to one-fifth per cent, or a loss of but three ounces to 100 pounds of butter.

The ancients churned the cream of goats by shaking it in sacks. Sometimes the sack was swung like a hammock. The Armenian dairymaid still hangs her goatskin churn by cords beneath a tripod and swings it to and fro by hand. A small amount of butter may be made by whipping with a spoon. The old-fashioned

churn, with a dasher raised up and down by a handle, is still fresh in memory. Modern churns consist of a series of paddles on a common axis caused to rotate by means of a crank. The principle is the same in all churns. By agitation of the cream, the fatty globules are jounced together and made to cohere. Churning should cease as soon as the butter collects into grains the size of wheat. It may then be taken from the buttermilk, worked with a paddle, and salted to taste. Working drives out the remnant of buttermilk, but care should be taken not to destroy the grain of the butter and make it greasy.

Dairy methods have changed greatly within the past twenty-five years. Creameries or factories now make about two-thirds of the total amount of butter produced in the United States. The cream is obtained from the milk by a separator consisting essentially of a series of tubes, centering like the spokes of a wheel in a central cavity. The machine is filled with milk and rotated with great rapidity. The heavier parts of the milk are driven by centrifugal force toward the outside of the machine, forcing the lighter oily globules into the center, whence they are drawn out and sent to the butter worker. A good separator will lose less than two ounces of butter out of one hundred pounds. Creamery butter, like factory cheese, is produced with economy, and under proper management is uniformly of high class.

During 1921 there was a very great increase in the quantity of creamery butter produced in the United States, the total production for the year being 1,054,938,000 pounds, an increase over 1920 of 191,360 pounds. The total production of farm and factory butter, exclusive of whey butter, for the year 1921, is estimated to have amounted to 1,705,438,000 pounds, notwithstanding the regular decrease in production of farm butter. The farm production for the year was approximately 650,300,000 pounds. The imports into the United States for the year ending June 30, 1922, totaled 9,551,292 pounds. Dairy or homemade (farm) butter is usually sent to market in prints; creamery butter in wooden firkins, or jars, or in pound bricks, wrapped in oiled paper. Denmark is one of the world's largest exporters of butter. Average yearly exports of butter-selling countries are reported as follows:

Argentina	6,341,589
Australia	87,894,943
Austria-Hungary	4,378,997
Belgium	3,509,265
Canada	3,673,702
Denmark	195,052,426
Finland	24,471,285
France	54,357,279
Germany	398,592
Italy	8,295,469
Netherlands	72,456,276
New Zealand	39,931,920
Norway	2,738,708
Russia	123,541,889
Sweden	47,949,953
United States	7,511,902
Other countries	5,045,000
Total	683,141,468

The butter imported yearly by butter-buying countries under normal conditions is shown in the following table:

Australia	80,111
Belgium	12,718,269
Brazil	4,944,999
British South Africa	3,645,416
Denmark	6,240,561
Dutch East Indies	3,474,789
Egypt	2,936,170
France	10,664,973
Germany	92,815,865
Netherlands	4,491,879
Russia	1,300,061
Sweden	205,352
Switzerland	11,062,683
United Kingdom	476,805,840
Other countries	25,298,000
Total	656,454,275

See CHEESE; CATTLE; DAIRYING; ADULTERATION.

Buttercup, a large group of flowering herbs. The Latin name, *Ranunculus,* little frog, perhaps refers to the wet places in which many kinds grow. Another name, crowfoot, has, no doubt, reference to the shape of the five-toed leaves of the most common species. Buttercup comes from the yellow color and cup-shape of the flower. The English buttercup is the plant children hold under each others' chins to see by the yellow glow "whether they love

butter." Buttercups have a simple flower, in that all parts of the flower grow entirely distinct. There are over two hundred kinds. The garden buttercup originated in Asia. Some of our native buttercups are aquatic and have thread-like leaves. The tall buttercup, a visitor from Europe, and a plague in pastures, has established itself in New England and around the western end of Lake Superior. Buttercups are usually yellow—sometimes white. The marsh marigold, virgin's bower, clematis, anemone, pasque flower with its hairy "goslings," columbine, and even the larkspur, all belong to the crowfoot family.

Butter-Fat, in dairying, the fatty or butter-producing portion of milk. Butter-fat exists in the form of small globules from 1/15000 to 1/2500 of an inch in diameter. The globules can be seen in a drop of milk placed under a microscope. The globules weigh .93 as much as water; the rest of the milk weighs more than water, If milk be allowed to stand quietly, the settling of the milk forces most of these globules to rise to the surface, where they form cream. The amount of fat in the average milk of the different breeds of cattle, expressed in percentages, according to tests made at the New York Agricultural Experiment Station, is:

Holstein-Friesian	3.4
Ayrshire	3.6
Shorthorn	4.4
Devon	4.6
Guernsey	5.3
Jersey	5.6

Jersey milk is richest in butter-fat. Twenty-five Jersey cows exhibited for 120 days at the Louisiana Purchase Exposition at St. Louis, 1904, produced a daily average of 1.9 pounds of butter-fat per cow. This made an average of 2.3 pounds of butter or 6,841.6 pounds of butter for the twenty-five cows in 120 days.

There is great diversity in the richness of the milk produced by different cows of the same breed, in the milk produced at different times of the day, and in the milk produced by different kinds of feed. The milk of some Holsteins contains more fat than the milk of some Jerseys. A famous Holstein cow, Colantha 4th's Johanna, tested by the Michigan Agricultural Experiment Station, produced 28.176 pounds of butter-fat in 7 days; 110.883 pounds in 30 days; 208.398 pounds in 60 days, and 998.256 pounds in a year.

Morning milk ordinarily contains a larger percentage of fat than evening milk. Clover and bran and green bluegrass pasture favor the production of milk having a high percentage of fat. The creameries that buy milk pay for the butter-fat. Farmers sending milk to a coöperative creamery are credited with the amount of butter-fat it contains.

Butterfly, a large family of insects allied to moths or millers. All butterflies have four membranous wings covered with scales, or modified hairs. The mouth parts are formed for sucking nectar and plant juices. For a general statement of the four stages in the life of a butterfly, see article on INSECTS. The stages are called, the egg, larva or caterpillar, pupa or chrysalis, and adult or butterfly. The term chrysalis applied to the pupa stage means golden. It refers to the gold spots with which the pupa of the butterfly is frequently marked.

Butterflies may be known from moths in several ways. They fly by day. Their antennae or feelers are knobbed, never pointed or curved at the tip. They hold their wings upright above the back when at rest, and the abdomen of the butterfly is slender. If all these characteristics are present, the insect is a butterfly, not a moth.

Caterpillars live on foliage. The adults are provided with long, coiled sucking tubes which they straighten out and use to draw nectar from flowers. There are not less than 30,000 kinds of butterflies. South America is butterfly headquarters. Each has its favorite plant on which to deposit eggs, and each goes to its favorite flower for honey. Some are named from their color, some from the shape of their wings, and some from the locality in which they are found. The White Mountain butterfly, for instance, is found only on the tops of the White Mountains and similar peaks in Colorado. The shape and direction of the veins in the wings are depended on by entomologists in describing a species. Some

of the common names are monarch, viceroy, meadow-brown, grayling, hop-merchant, mourning-cloak, tortoise-shell, painted-beauty, admiral, Baltimore, snout, long-beak, metal-work, long-stripe, hair-streak, wanderer, blue, copper, sulphur, dog's head, orange-tip, checkered-white, cabbage, swallow-tail, and others requiring a volume to describe them.

The study of moths and butterflies is a fascinating branch of natural history. In the principal cities of Great Britain, there are museums of natural history in which cases of local butterflies are given a prominent place. Local collections are gaining in favor in America. The wing of the butterfly is very fragile. The scales are likely to be disturbed and rubbed off by handling. Former methods of pinning these fragile insects in cases have proven unsatisfactory. Specimens are broken up by handling and shaking. Mr. William D. Denton has invented a method of mounting the insect with outstretched wings between two squares of glass. A specimen mounted in this way may be handled without damage. Both sides of the wings may be seen to advantage.

Collecting has acquired commercial importance. A local collection of sixty butterflies is worth about $25. The leaf butterfly of India is worth $5; the owl butterfly of Colombia, $10; one of the Jamaica butterflies, $20. Occasionally a collector receives an extraordinary price for some rarity. A butterfly was sold to one of the Rothschilds for $3,000. It is said that Worth, the Parisian man-milliner, gives a standing order for butterflies not in his collection. He desires them in order to make a study of the combination of colors.

Although butterflies move with seeming languor, they are not easily captured. Many of them sail at heights beyond the reach of a net. The collector studies the habits of each butterfly, and knows what flowers each frequents. In this way he is able to be in the right spot when the butterfly alights on its favorite flower to sip nectar. Butterflies have queer tastes. Some species are attracted by stale fruit. A rotten banana planted in the fork of a bush proves a lure for certain species. One African species is attracted by the scent of civet.

A favorite device of the collector is to smear the trunk of a tree with a sweet mixture, such as common brown sugar and thick molasses. This mixture he moistens with beer and rum. Trees along the edge of a forest are best for the purpose. The collector passes from tree to tree with his collecting jar, and is very likely to find butterfly beauties sipping away at the sweets so intoxicated that they can be brushed into the jar before they know what he is about. A second round, made in the night with dark lantern in hand, is likely to result in the capture of moths. Many rare specimens, both of butterflies and moths, have been taken in this way. In case live specimens cannot be secured, cocoons are gathered and hatched out.

Their apparent leisure and gay colors is the basis of the expression, "butterflies of fashion," as applied to society people. Spenser, describing Minerva's wondrous needlework in the contest with Arachne, says:

Amongst these leaves she made a Butterfly,
With excellent device and wondrous slight,
Fluttering among the olives wantonly,
That seemed to live, so like it was in sight;
The velvet nap which on his wings doth lie,
The silken down with which his back is dight,
His broad outstretched horns, his hairy thighs,
His glorious colors, and his glistening eyes.

See MOTH; INSECTS; ARACHNE.

Butternut. See WALNUT.

Butterworth, Hezekiah (1830-1905), an American editor and author, whose writings are seldom surpassed in the field of juvenile literature. He was born on a farm in Rhode Island and began his career as a writer on the staff of the *Youth's Companion,* of which he became editor in 1871, holding the position until 1894. In the decade 1877-1887 he increased the circulation of the *Companion* from 140,000 to 400,000. Mr. Butterworth traveled extensively, and is widely known by his *Zig Zag Journeys,* a series of stories on travel to all parts of the world. *The Boyhood of Lincoln, In Old New England* and *The Wampum Belt* are popular historics from his pen. His published volumes number about sixty.

Buttons, well known devices used for fastening clothing together, and as ornaments. A button is secured to one edge of a garment by thread or a rivet, and is then passed through a slit, buttonhole, or loop in the other edge. It is a substitute for pins, clasps, and buckles. Buttons are of two general forms. One has from two to four perforations near the center through which the fastening thread may be passed with a needle. The other form is provided with a shank made of wire or canvas, which may be sewed to the garment. The shank is sometimes passed through the fabric and fastened on the reverse side. The shank of a shoe button is sometimes fastened to the leather with a wire stamp.

It would be difficult to name a material which has not been used in some form for buttons. Flat buttons with perforations are made chiefly of porcelain, glass, pearl, leather, vulcanized rubber, wood, brass, iron, silver, ivory, horn, tortoiseshell, bone, paper, plastic clay, vegetable ivory, etc. The latter material is the nut of a palm tree. It is turned easily and is a favorite material for buttons for suitings, owing to the fact that it is dyed readily to match any cloth whether plain, marbled, or mottled. Nine thousand tons of these nuts are imported yearly. The business of making buttons out of pearl shells has grown to be a large industry. Button making was begun in the United States as early as 1753, and was well established in the manufacturing centers.

The common pearl buttons of commerce are made from the mussel or clam shells which are found in profusion in many rivers, but especially in the Mississippi and its tributaries. The industry was started in America about 1890 by J. F. Boepple, of Muscatine, Iowa, who had learned the art of making pearl buttons from seashells in Europe. Finding the mollusk shells of the Mississippi suitable for the purpose, he set up a foot-power machine, secured a supply of shells, and started the manufacture of buttons. The shells are gathered from the river bottom by raking or dredging with tongs or hooks to which the mussels or clams, lying partly open, attach themselves in self-defense. At the factory they are sorted and classified, the best varieties being known as "niggerhead" and "mucket." They are then soaked in large tanks for a week or more, after which blanks or disks of various sizes are cut out of them by a machine like a lathe, with a hollow circular saw. The blanks are classified as to thickness and quality. They are then churned to remove rough edges, ground to uniform thicknesses, soaked to soften them, and finally shaped to pattern and drilled with holes by an ingenious automatic machine. After another churning process, which leaves the surfaces smooth, the buttons are polished in barrels containing an acid, which gives them the desired pearly luster. They are then sorted, counted, inspected, carded, and finally boxed for shipment. The waste left over after the button blanks have been cut from the shells is crushed or pulverized and sold for poultry food; while the fine dust resulting from the crushing process is utilized by farmers as a fertilizer. Thus the only real waste in the entire process is the original inhabitant of the shell, which, not being generally esteemed as edible, disappears in a manner which is one of the tricks of the trade of mussel fisherman.

Various kinds of composition buttons have also been made in the United States since 1862, when the industry was started in Newark, N. J., with a composition resembling vegetable ivory, produced from certain gums combined with carbonate of lime, feldspar or mica. Hundreds of patents for button machines and button-making have been issued by the U. S. Patent Office. The manufacture of celluloid buttons for campaign and other advertising purposes is a unique branch of the industry.

Buzfuz, Serjeant, a pompous barrister in Dicken' *Pickwick Papers*. He becomes counsel for the plaintiff in Mrs. Bardell's famous breach of promise suit against Mr. Pickwick. He bullies his witnesses at the trial and seems especially talented in drawing, from the simplest circumstances, inferences to incriminate Mr. Pickwick.

Buzzard, or Turkey Vulture, a bird of prey belonging to the family of Ameri-

can vultures. The common species ranges from Manitoba to Patagonia. In the northern part of the Mississippi Valley, the buzzard seems to be sharing the fate of other large birds. It becomes rarer from year to year, but in the south it is protected by law, and is the official scavenger of farm and town, taking care of a dead farm animal, a cat in the gutter, or of kitchen offal. It shambles out of the way of a foot passenger, but is almost as fearless as a turkey. It has a hooked yellow bill, a bare, bright red head and neck, black glossy plumage edged with brown, and a meager body about thirty inches in length. The nest, with three dirty white, chocolate-speckled eggs, is placed in a hollow stump, or on the ground like that of a turkey. A smaller species, the black vulture, performs a similar service in South America. The buzzard is a serviceable, but necessarily a revolting bird. In its flight only, the buzzard is admirable. Whether coursing with soft wing and keen eye in search of food, or soaring aloft in graceful spirals, the buzzard's flight is the poetry of motion. Buzzards see a long distance. Should a buzzard discover a carcass, his dropping would be noted by some distant neighbor, who would hurry to the scene, noticed in turn by others, and these by others still further off, until, in an incredibly short time, a large assemblage had gathered. Travelers on the plains state that saddle and bridle cannot be removed from a spent horse before a circle of impatient buzzards has formed, even though not one was in sight a moment before. See VULTURE; CONDOR; PARSEES.

Byng, Julian Hedworth George, First Baron Byng of Vimy (1862-), an English general who won signal honors in the World War, and who has been Governor-General of Canada since 1921. Joining the army in 1883, he served distinctively in the Soudan expedition, and after the South African war, 1899-1902, he received both the King's and the Queen's medals. In 1902, he was brevetted colonel. He was promoted to the rank of major-general in 1909, and in 1912 was appointed commander-in-chief of the Egyptian army under Lord Kitchener's administration. Recalled from Egypt at the outbreak of the World War, General Byng commanded the 3d cavalry division during 1914-15. His troops covered the Belgian retreat and checked the Germans at the first battle of Ypres. In 1916, General Byng commanded the Canadian Corps on the western front, his troops fighting heroically in the battle of the Somme and in the valorous capture of Vimy Ridge. Placed in command of the 3d Army in 1917, General Byng opened the drive on Cambrai, and in a short while the famous Hindenburg line was smashed. He received many decorations, including medals from France and from the United States, and was formally thanked by Parliament for his services. In 1921, he was appointed Governor-General of Canada. He had retired from the army in 1919, after thirty-three years of service.

Byrd, William (1674-1744), an American author, born at Westover, Va. He was educated in England, and on his return lived on his plantation, Westover, and gathered there a library of about 4,000 volumes. He wrote the *Westover Manuscripts* (1841), published under three titles: *The History of the Dividing Line, A Journey to the Land of Eden,* and *A Progress to the Mines.* These are interesting, and show wit and keen observation.

Byrd was the founder of Richmond (1733), and as commissioner on the North Carolina boundary, did much to encourage immigration. He was a patron of art and science. Byrd's letters have been published in *The Virginia Magazine of History and Biography.*

Byron, George Gordon, Lord (1788-1824), an eminent English poet. His mother was a Gordon of Aberdeenshire. His father was a dissipated captain, John Byron, a man of good family, who deserted his wife soon after the birth of young George. She retired to Aberdeen and lived in a small way, sending her son to the grammar school. His mother's temper and his own appear to have prevented their living happily together. At one time she caressed him, and at another threw the poker at his head, and called

him a "lame brat," in allusion to a deformed foot. His playmates said to him, "Your mother's a fool." "I know it," was his answer. In 1798 the death of his grand-uncle, Lord Byron, left him a title, but very little property. He was sent, however, to the school at Harrow. "I soon found," wrote the head master, "that a wild mountain colt had been submitted to my management." In 1805 he entered Cambridge University where he paid little attention to study, but read omnivorously and excelled in outdoor sports. During his college residence he published a volume of verses entitled *Hours of Idleness*. It was criticized in a rasping, contemptuous manner by the *Edinburgh Review*. Byron took his time and wrote the famous onslaught known as *English Bards and Scotch Reviewers,* a satire directed against those who had criticized him. Later he himself called it "a miserable record of misplaced anger and indiscriminate acrimony." In 1809 he set out on a tour through Portugal, Spain, Greece, and Turkey. On his return he published the first two cantos of *Childe Harold*. Byron indeed disclaimed all connection between himself and Childe, but the poem reflects only too faithfully his own mental unrest and struggles. It ran through seven editions inside of a month, and as Byron said of himself, he "woke up one morning to find himself famous."

We cannot go into a discussion of Byron's moral conduct. He set at defiance all laws of marriage and morality. He rivals Burns in the facility with which he picked up illicit acquaintances and deified them in verse. In 1815 he married a Miss Millbank, but the ill sorted match was soon dissolved. He appears to have been capable of treating his wife with brutality, and she him with contempt, and yet his *Fare Thee Well,* a poem written after their separation, is one of the tenderest things in the English language.

Childe Harold was afterward extended by the addition of a third and a fourth canto. Other famous poems are the *Prisoner of Chillon, Manfred, Don Juan, Giaour, Corsair,* and *Bride of Abydos.*

In 1816 Byron left England for the continent, and resided at various cities of southern Europe. In 1823 he became interested in the struggles of Greece for independence. He raised all the money he could, and set out for Missolonghi, where he was received with great enthusiasm by the Greeks and given a military command. Before he had been able to render much service, he was seized with a fever and died April 9th. The Greeks desired to bury him there, but his remains were taken home to England. Burial at Westminster was refused on the ground of irreverence, and he was laid at rest by the village church of Hucknall near Newstead Abbey.

See MAZEPPA; CHILLON.

QUOTATIONS FROM BYRON.

There is a pleasure in the pathless woods,
There a rapture in the lonely shore,
There is society, where none intrudes,
By the deep sea, and music in its roar.
I love not Man the less; but Nature more,
From these our interviews, in which I steal
From all I may be, or have been before,
To mingle with the Universe, and feel
What I can ne'er express, yet cannot all conceal.

A thousand years scarce serve to form a state
An hour may lay it in the dust.

All who joy would win
Must share it,—happiness was born a twin.

I've stood upon Achilles' tomb,
And heard Troy doubted: time will doubt of Rome.

'Tis strange, but true; for truth is always strange,—
Stranger than fiction.

Byzantium, bĭ-zăn′shĭ-ŭm, a Greek city on the Bosporus. Constantine the Great enlarged it greatly, changed its name to Constantinople, and made it the capital of the Roman Empire (324 A. D.). At the division of the Roman Empire Byzantium became the seat of the Eastern, the Greek, and the Byzantine Empire, as it was variously called. The term Byzantine occurs frequently in connection with the churches, the art, literature, emperors, and the government of the East. Byzantine art is noted for an oriental luxuriance and coloring. In architecture the principal feature of note is the success with which round domes are supported on square bases, as in the church of St. Sophia at Constantinople. See CONSTANTINOPLE.

C

Cab, a two or four-wheeled vehicle drawn usually by one horse, and plying for hire. The cab is a closed carriage. The driver sits on an outer seat. A bus plies over a regular route and is open to all who care to enter and pay a regular fare. A cab belongs exclusively to the person who hires it, being for the time a private carriage. In all important cities cabs stand near passenger stations and near large hotels waiting for fares. There are between 15,000 and 20,000 cabs in Paris. These cabs seat two persons. The fare is thirty cents for an ordinary drive, or forty cents an hour. Tables of legal fares are posted in the cab. In case of dispute the driver may be required to drive to a police station. In London there are about 10,000 cabs. Two persons are carried a mile for a shilling, equivalent to a quarter of a dollar. The price in Berlin is a mark, about the same. American prices are much higher, but are controlled likewise by ordinance.

Cabal, kȧ-băl′, a French word signifying a set of intriguers. It so happened, in the reign of Charles II, that an intriguing ministry was composed of Clifford, Ashley, Buckingham, Arlington, and Lauderdale. From the fact that their initials form the word, they were known as the Cabal, a term now well rooted in historical writings. See ACROSTIC; CONWAY CABAL.

Cabala, kăb′ā-lȧ, the oral law of the Jewish rabbis, supposed to have been received by direct revelation and handed down from father to son by word of mouth. It is in reality a sort of occult science founded on the belief that every word, letter, and accent of the Hebrew scriptures contained some hidden meaning. The Cabalists—those versed in the cabala—claimed by interpreting these secret meanings they could perform miracles and foretell future events.

Cabbage, a plant of the mustard family. This is the plant family to which the turnip, lettuce, radish, shepherd's purse, sweet alyssum, and cress all belong. The cabbage still grows wild on the sea cliffs of the English Channel and of the Mediterranean Sea. The leaves are thick and eatable, but do not form a rosette or head. This wild cabbage, transferred to gardens and improved by cultivation, is the parent of our cabbages, cauliflowers, Brussels sprouts, and kales. Georgia collards, cultivated for greens, are the wild cabbages little changed. The Scotch kale also forms no head, and is much like the original cabbage. Cauliflower is the most changed of all, but we owe it to pretty ancient gardeners. It was well known to the Greeks and Romans. The cauliflower head is partly leaf, but is really composed in large part of enormous flower buds. The cabbage proper has a dense head of leaves. Under ordinary circumstances a cabbage forms a head one year and, if put into a cellar and reset the next spring, or if protected from freezing where it stands, produces seed the second year. The plant then dies. Cabbages produce an enormous number of seeds. A single plant will not infrequently have seed enough to furnish plants for twenty-five acres. Cabbages will not head during hot weather, and for that reason judgment is needed in planting varieties that are well headed before midsummer, or varieties that head late in the season. Cabbage seed is usually sown in window boxes or hotbeds, and the young plants are transplanted when about three inches high. They require from 90 to 200 days, according to variety, to mature. Cabbage is an excellent preventive against some kinds of sickness, particularly scurvy. If cabbage be cut up and packed in a barrel with a liberal sprinkling of salt throughout, a weak brine is formed of the juice of the plant, and slight fermentation takes place. The product is sauerkraut.

Cabbage Worm, the most destructive enemy of the cabbage, is the cater-

pillar of a small white butterfly. The worms are of a bluish-green color and about an inch and a half long. They feed upon the tender leaves of cabbage and lettuce and will attack other plants. Unless checked, they may destroy a field of cabbage in a few days. There are three species but they bear a close resemblance. They can be destroyed by spraying the plants with kerosene emulsion before the heads form.

Cabinet, an executive council. It consists of the leading officers of the government. The English cabinet and United States cabinet are the oldest, and are the types on which the cabinets of other countries are modeled. In the reign of Charles I the name was given for the first time to a committee of his privy council that met to arrange public business. At the present time the English cabinet consists of an indefinite number, usually about eleven. The formation of a new cabinet proceeds with outward show of courtesy and kingly authority; the monarch sends for a prominent statesman, appoints him premier, and asks him to form a government,—that is, to suggest names of suitable persons to be appointed to high official positions. The cabinet includes the premier himself, who acts also as lord of the treasury or secretary of state for foreign affairs. A secretary for war, for home affairs, for the colonies, and for India, the chancellor of the exchequer, first lord of the admiralty, the lord privy seal, the lord chancellor, the chief secretary for Ireland, postmaster general, and the president of the board of trade are the chief appointive positions, entitling the holder by custom to a seat in the cabinet.

In reality the king has no hand in the appointment of a new ministry. His part is a polite fiction, a relic of former political conditions. The prime minister is suggested by the party leaders, and the cabinet is made up by him, in consultation with these leaders. The "king's cabinet" is not his; it is the ministry of the House of Commons. It is understood that the king is not responsible for the makeup of the cabinet, and that the ministry is responsible, not to the king, but to the House of Commons. The cabinet meets in executive session and keeps no minutes. Its deliberations relate to the policy of the government. The measures to be introduced into Parliament are arranged here. Whatever differences of opinion may arise, they are not made public.

Theoretically any member of the house may introduce a measure, but unless the proposed act has the sanction of "the government," that is to say, of the ministry, it is likely to secure scant attention. When an important measure proposed by the ministry is defeated, custom requires the ministry to resign or to call for a new parliamentary election. In case of resignation, the king calls upon the leader of the opposition to form a new ministry. In case a writ is issued for a parliamentary election, the issue is clear. The candidates stand for the old ministry or for a new, and the voters decide. When the results of an election are known, the country knows ordinarily the name of the next prime minister, quite as positively as Americans know whom the Electoral College will select for president. As there may be groups of members in the House of Commons that represent minor political parties, whose support of the ministry is subject to withdrawal, a ministry may be defeated most unexpectedly. Its usefulness, practically its life, may come to an end within a few hours' time of appointment; and, on the other hand, an opponent of "the government" may wait anxiously for years before the ministry is defeated. In case the opposition in the House of Commons thinks that the government has lost the support of the House and does not know it, or is not willing to acknowledge defeat, a resolution may be introduced declaring a "want of confidence." If the resolution carries, the ministry has no help for it but to resign or call for an election.

The first American cabinet consisted of four members,—the secretary of state, of war, of the treasury, and the attorney general. The secretary of the navy was added in 1798; the postmaster general in 1829; the secretary of the interior in

1849, the secretary of agriculture in 1889, the secretary of commerce and labor in 1903, the secretary of labor in 1913. In case of death of both the President and the Vice-President, the members of the cabinet preceding the secretary of agriculture, succeed to the presidency in the order named except that the postmaster general precedes the secretary of the navy. See PRESIDENT.

Contrary to popular impression, the Constitution does not provide for a cabinet. The president is authorized to require the opinion in writing of the heads of the executive departments, and provision is made also to vest the appointment of subordinate officers in the heads of the departments; but the Constitution does not hint at the creation of a cabinet whose members meet with the president in a body and consult on matters outside of their own departments. It was not the intention of the makers of the Constitution that the policy of the government should be determined by an advisory body. In 1789 the first Congress created four departments. President Washington created the cabinet by calling the heads of these departments together for consultation. The practice is now an unwritten law.

The secretary of state is, by common consent, the leading member of the cabinet. When the cabinet meets for consultation he sits at the president's right hand. The members of the American cabinet, that is to say, the secretaries of the departments, are appointed by the president with the approval of the Senate, for four years, or for the unexpired part of a presidential term. Secretaries are removable by the president at will. Custom, unwritten law again, requires that the cabinet officer shall perform his duties in a manner satisfactory to the president. If the secretary's course in an important matter meets with the disapproval of the president, he is expected to resign. The regular salary of a cabinet member is $12,000 a year.

See PARLIAMENT; CONGRESS.

Cable, George Washington (1844-), an American author. He was born in New Orleans. When he was fourteen years old his father died. The boy was obliged to leave school to support his mother and sisters. In 1863 he enlisted in the Confederate army and proved himself a heroic soldier. After the war he returned to New Orleans, where he was occupied as a clerk, a surveyor, and a writer on the *New Orleans Picayune*. But Cable became deeply interested in the Creoles. He made himself a familiar friend in certain of the old French homes of Louisiana where a poetic instinct, coupled with family pride, had kept alive a host of old tales and traditions. Here he gathered materials for the short stories and sketches of Creole life which he began to send to *Scribner's Magazine*. These stories were collected in book form in 1879, under the title *Old Creole Days*. None of his later writings have equaled these tales in popularity. For some years Cable has resided at Northampton, Massachusetts. He is known as a lecturer, as well as a writer. He has been interested, also, in organizing a system of home study clubs. The stories of *Old Creole Days* are Cable's masterpieces. Next to these, stand the *Grandissimes* and *Dr. Sevier*. *Madame Delphine* and *Bonaventure* may be mentioned also. Cable's style is smooth and graceful, often poetical. His stories are dramatic, full of delicate humor and pathos. In the use of dialect he is a master.

With the conscience of a historian and the eye of a poet, he presents the scenes and characters with which his own life was intimately associated; he paints the reality of a quaint and picturesque life with the fascinating tints of ideal coloring.—Abernethy.

Cables, in telegraphy, wires stretched at the bottom of the ocean for the purpose of transmitting messages. In 1844 Morse made his great discovery of the electric telegraph. In 1850 a cable twenty-seven miles long was laid across the English Channel, but it chafed apart on a jagged reef after a day's service. The next year a stronger cable was laid across the channel. Its success fired Cyrus W. Field, a wealthy American merchant, with the project of laying a cable across the Atlantic. The plan was ridiculed in public journals on both sides of the ocean. In 1857,

however, two warships, one American, one British, undertook to lay a cable, starting from the Irish coast; but it parted 250 miles out at sea. Nothing daunted, Field was ready with a larger cable the next year; and it was successfully laid from Valentia, Ireland, to Heart's Content, Newfoundland. On August 8th, at 11:12 A. M., Queen Victoria addressed President Buchanan in a short message beginning "Glory to God in the Highest," and President Buchanan made a suitable reply. The *London Times* reported the marvelous success of the cable, stating that "the highest exaggerations of an Arabian tale have been outdone by this simple achievement of modern times." Queen Victoria's message of ninety words required sixty-seven minutes in transmission, the sending and receiving instruments being a little imperfect. After conveying forty telegrams in twenty-three days' time, the cable ceased to work. In 1865 Field started from Valentia with a $3,000,000 cable, but it parted in mid ocean. In 1866, undismayed by the loss of three fortunes, Field was ready again with still another cable which was laid successfully July 27, 1866. The first important news was the signing of the treaty of 1866 between Prussia and Austria. At first the tariff was five dollars a word.

Submarine cables are manufactured chiefly in England. A modern cable consists of one central copper wire, surrounded by twelve smaller ones wound rope fashion about it. The diameter of the entire twist is about one-fourth of an inch. This copper rope or core is encased in a gutta-percha covering, making the diameter about three-fourths of an inch. Hemp and canvas tape are wrapped about the gutta-percha, and an armor of steel wires is wrapped about this again, the crevices being filled up with an asphaltic cement. The cable is put up in two-mile sections, and is tested carefully for conductivity and possible leakage before it is transferred from the factory. In laying a cable the sections are stored in the ship in tanks of seawater. The section which is laid next the shore is guarded carefully to prevent possible chafing against rocks. It is laid at about the rate of five miles an hour. The working ship is in constant communication with the shore through the portion of the cable which has been laid. In case of a break or fault in a cable, electricians have now become so expert that they can locate the defect within a mile. Repair ships have in this way been enabled to grapple a broken cable within a few hundred yards of the actual break in mid ocean. Forty-one ships are kept busy laying and repairing cables in various parts of the world, so extensive has the business become. Cables have been brought up from a depth of 15,000 feet, that is to say, three miles of water. One case of repairs is on record which cost the company $50,000.

In 1921 there were 298,000 nautical miles of telegraph cable in operation, connecting all civilized countries of the world. This mileage comprised some 3,000 separate cables, of which 2,540 were administered by the various governments concerned; the remainder were the property of private companies.

Over 130,000 nautical miles of the world's cables are owned by British companies; 70,000 by American companies and 24,000 by companies in other countries. In 1912 all British Atlantic cables passed to the administration of the Western Union Telegraph Company of America. Notwithstanding the dangers from submarines, the British Telegraph Construction Company was continuously engaged in repairing, diverting and laying submarine cables during the World War. In 1915 an Anglo-Russian cable, extending from Peterhead, Scotland, to Alexandrosk, near Petrograd, was laid.

The value of submarine cables to the allied nations during the World War is beyond estimate. Immediately after the declaration of war all German cables were severed, and Germany did not regain use of them until after the Armistice.

Many devices for transmitting and receiving messages have been perfected. Messages are sent at the rate of sixty or more words a minute and messages can be sent both ways at the same time. An

automatic transmitter consisting of a paper tape in which holes have been punched to represent the dots and dashes of the telegraph alphabet is in general use.

The rates for cable messages are much higher than those for land messages. To reduce expense messages are sent in code, an arrangement in which one word may take the place of an entire sentence. All business codes are nationalized and have the same meaning in all countries. See FIELD, CYRUS W.; MORSE; TELEGRAPHY.

Cabot, John, an Italian navigator. Little is known of his birthplace or the place of his death. He was in the employ of the English government with headquarters at Bristol where his son Sebastian, also a celebrated navigator, was born. In 1497 John and his son Sebastian sailed westward from Bristol in a single vessel. June 24, 1497, they discovered the coast of Newfoundland, or, as others think, of Labrador, and followed it south for a distance of 300 leagues as far as Florida. The English exchequer of the period records a gift of $50 "to him that found the new Isle." On the following year they revisited the coast of North America. They were the first to raise a flag on the American mainland. Their voyages are the basis on which English title to territory in the New World rested. Among the odd stories told by the sailors was one to the effect that the codfish on the banks of Newfoundland were so thick that they retarded the ships. Sebastian's part in the voyages of 1497 and 1498 has been disputed. See BRISTOL.

Cabot, Sebastian (1475-1557), an English navigator, born in Venice. He was one of the sons of John Cabot. He was a cartographer of some note and was employed to prepare maps for an English military expedition to France in 1512. He later entered the service of the King of Spain and became head of the Spanish navigation office, which position he held for thirty years. There is evidence that in 1517 or 1518 he led an English expedition in search of a northwest passage to Cathay. In 1526 Charles V. gave him the command of an expedition, the object of which was to pass through the Strait of Magellan and trade in the Spice Islands. Cabot entered the mouth of the river, which he afterwards named La Plata, with the hope of finding another passage to the Pacific.

Cabral, a Portuguese navigator, the discoverer of Brazil. He lived about 1460-1526. On the successful return of Vasco da Gama from India, Cabral was sent out to follow up the discovery. He set out from Lisbon, March 9, 1500. It was his intention to round the Cape of Good Hope, but he kept too far out in the Atlantic, and was carried by a current upon the coast of Brazil April 22, 1500. This will not seem strange if we recall that the eastern coast of Brazil is less than seventeen degrees west of the African coast, and that the route was as yet largely guesswork. Cabral took possession of the coast in the name of Portugal and sent back one of his ships with tidings. This was the basis of Portuguese claims in the New World. Continuing his voyage around Cape of Good Hope, Cabral lost four ships in a storm; yet finally reached Calicut (whence calico), India, where he erected a fort. Cabral entered into treaties with various native princes and loaded his ships with cargoes of spices, then a fortune. He returned to Lisbon July 23, 1501. His subsequent life is unknown.

Cacao, kȧ-kā′o. See COCOA.

Cache, kȧsh, a French word meaning a lurking hole. To cache provisions is to hollow out a hole in the ground with greater or less care in which to conceal them until needed. The ground is, of course, leveled off and all traces of digging concealed carefully, while the location of the cache is fixed in mind by some tree, stone, or natural object. This device is often employed by travelers and hunters. The half civilized Indian villagers used to cache their corn to prevent its being devoured by visiting hordes. Arctic explorers speak of caching a part of their provisions under stones or chunks of ice for use on the return trip.

Cactus (plural *cacti*), a group of peculiar plants. Aside from a few African species of doubtful relationship, the entire family of one thousand well known forms

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GIANT CACTUS

is strictly American. They extend from the western plains, through Mexico, Central America, and the West Indies, to the southern part of South America; one species is found even in Alaska, but Mexico and our states along the Mexican border are the center of the cactus region. Cacti are more readily recognized than described. They grow in many shapes. The different kinds vary in height from that of a thimble to the giant cactus, sixty feet high. They have a fibrous, woody center of considerable strength, surrounded by soft, juicy flesh, the whole inclosed by a membrane, through which evaporation goes on with extreme slowness. A cactus is planned to stand for months under a hot sun without losing the moisture of its fleshy stalks. Some species have flattened stalks; some kinds are globular, like a melon; some kinds are cylindrical, like a sack of grain. Some stems are upright; some kinds sprawl over the ground; some branch again and again, throwing out lobe after lobe, and others branch scarcely at all; but in every case the cactus is built with a view to keep what water it has and to expose very little surface to the hot air and sun. An elm tree aims to throw out leaves and expose as much surface to the air as possible. The cactus, living in a different country, where an ordinary tree would lose all its water and wilt in an hour, has shaped itself on the opposite plan. The skin of most cacti is covered with bunches of sharp spines, possibly reduced leaves, the use of which is not understood, but which inflict painful wounds if handled carelessly.

The melon cactus is something like a watermelon on end; the lower end rooted, the upper end surrounded in season by a circle of beautiful flowers. The giant cactus raises a large stem, surmounted by huge vertical branches, as bare of leaves as a huge telegraph pole.

Some kinds of cacti have become accustomed to bloom only for a few hours, and that at night, when it is a trifle cooler than in the daytime. The night-blooming cereus is often kept as a house plant. Lovers of flowers, who have seen one open, have felt that they were present at the performance of a floral mystery. The flowers of cacti generally are attractive.

The greatest service these plants render is no doubt the crumbling of lava and other rock by their roots. In this way they prepare soil for other plants, and in time convert bare rock into a vegetation-producing area. The most useful member of the family, a much branched genus, has been introduced in Mediterranean countries under the name of "the prickly pear," "Indian fig," etc. A branch placed in a crevice of pure lava will manage to make its hold good. On Mt. Vesuvius, as soon as the lava from an irruption has cooled, short branches of prickly pear cactus are placed in crevices about twenty feet apart over a large area. As soon as these have taken root and grown somewhat, the courageous genista, or Spanish broom, takes root, and soon the red-brown lava becomes a glorious bower of green leaves and yellow flowers, and the soil is prepared to receive other less hardy vegetation. Within five years after the eruption of 1904 some form of plant life extended to the foot of the lava cone.

This prickly pear is raised in Italy and Sicily for food. The flowers are usually yellow. The lobes are called the fruit. The fruit resembles a fig or a pear, and is about the size of a hen's egg. It is rather soft and mucilaginous, but pleasant to the taste. Herdsmen slice up the plants for their goats. In Mexico the dried plants are used for fuel. Prickly pears cut from the cactus hedge, "fish of the fence," they call them, form a considerable article of diet and are offered for sale in the city market.

One of the species of cactus, the Opuntia, is cultivated in Mexico as a host for the cochineal insect. The insect feeds upon the lobes, is killed at the proper time and dried, and from it is produced the brilliant carmine color so useful to commerce. A coloring matter for confectionery and a water-color for painting is gotten from the juice of the fruit of this same species.

Spineless Cactus. For a long time after 27 species of cactus were recognized by Linnaeus, the great botanist, in 1753, and recorded in his classification of plants,

the cacti were commonly known as thistles, probably from the spiny character of their protective armor. It is only within the last fifty years that special interest in cactus growths has been manifested in America. A few besides the night-blooming cereus, queen of the night, became favorite house plants, including the crab cactus and the rat-tail cactus. Large collections, however, have been formed in recent years at the Missouri Botanical Garden, St. Louis, the Botanical Garden at Cambridge, Mass., and by private individuals; and there is a famous collection at Kew Gardens, near London.

The fruits of many species of cactus are edible, and the value of cacti as forage plants would be much greater if they were spineless, although some varieties are spiny on one side and spineless on the other. Many attempts have been made, with varying success, to propagate plants that would be altogether spineless, and the Bureau of Plant Industry of the United States Department of Agriculture has made several such efforts. Bureau reports show that cuttings of the first spineless species seen in America were received from the island of Malta in June, 1905. These were planted at an experiment station, grew, and were then cut up and distributed to other stations in California and Texas. The result was a cactus of the Opuntia, or prickly pear, species, nearly spineless. Frequently short spines are produced in these cultivated plants, but they are very few in number. By 1910 a spineless cactus was produced at an experiment station, by continued cutting and back planting; and the experts of the bureau decided that the lack of spines is a character that can be maintained by vegetative propagation, as the result of a long series of selection, which is the method employed by Luther Burbank in his successful experimentation with various fruits and vegetables.

Spineless cacti, thus produced, often revert to spiny varieties, and some species, both in California and Texas, which are naturally very spiny frequently produce spineless joints. In all, twenty or more spineless varieties of the so-called Ficus Indicus group of cacti have been grown during the experiments of the Bureau of Plant Industry. These have all been derived from spiny forms. The spineless varieties in general thrive well with an abundant moisture supply, but species from drier regions are difficult to grow where there is a constant supply of moisture, and are much more difficult to establish under any condition.

After several years' experimentation with the prickly pear, Luther Burbank developed a spineless cactus that remains true to type. Not only did Burbank remove the spines from the surface of the plants, he also removed most of the wood fiber from the interior, producing a plant whose stalks are suitable for forage and whose fruit is an excellent human food. In a good soil the Burbank cactus will produce seventy-five tons of forage to the acre, and this production may be doubled the second or third year.

In all the larger species, especially, the spineless plants grown from cuttings and those grown from seed present a very different appearance. The latter are tree-like and the former are headed on the ground without distinct stems. The striking variation of certain spineless forms to a spiny condition is looked upon as a reversion to original type.

Certain species of cactus contain alkaloids that are used in medicine. Among the poorer classes of Mexico the very tender growths of one species are eaten raw as a sort of salad, and are also cooked for food. Numerous small fruits are gathered from wild cacti, and some of the species having elongated stems with a woody structure are utilized by the Mexicans in building their huts; while others yield grotesque and ornamental walking-canes.

The fruit is about three inches in diameter and resembles in form a short thick cucumber flattened at the ends. It varies in color from crimson to orange, yellow, purple and white. The flowers are as numerous as the colors. It may be eaten raw or made into jellies, jams or syrups, the same as other fruits. Cactus fruit sells for about the same price as

CACTI

1. "Cholla"
2. Pea-pod
3. Joint-leafed
4. Gooseberry
5. 6. Mistletoe
7. 10. Nipple
8. Golden Flowered
9. 18. Hedgehog
11. 23. Organ-Pipe
12. Giant "Sahuara"
13. Dwarf
14. Prickly-Pear
15. Night-blooming Cereus
16. Melon
17. Old Man
19. Leafy
20. Cabbage
21. Cochineal
22. Thistle

oranges, although it costs only about one-half as much to raise it.

One of the earliest experiments in the use of cactus plants as forage was made by the Arizona Experiment Station. The spines were singed from some of the prickly varieties, thus making it possible for cattle to eat them. It was found that with a gasoline burner a man could remove the prickles from about five tons of cactus a day, a sufficient quantity of green succulent food for 400 cattle. The New Mexico Experiment Station ran the singed stems through a root cutter. It was found that after the addition of a little grain and a handful of hay cattle did well on this food. Meanwhile the spineless cactus was developed, and further experiment became unnecessary. See COCHINEAL; BURBANK.

Cacus, kā′kŭs, in Roman legend, a giant, son of Vulcan. He lived in Italy on Mount Aventine, one of the seven hills of Rome. When Hercules was bringing the red oxen of Geryon from Spain, he rested near the dwelling place of Cacus. The giant admired the oxen and, while Hercules slept, stole a part of them. In order that Hercules might not be able to trace them by their footprints Cacus drew them backward by the tails into his cave. This stratagem was successful, and Hercules would have lost his oxen had they not lowed in response to the lowing of the rest of the herd as Hercules drove them past the cave. Although Cacus was a giant and had three heads, Hercules strangled the monster and recovered his bright oxen. Sancho Panza, in Cervantes' *Don Quixote,* alludes to the stealing of the oxen when he says of Rinaldo, "There be greater thieves than Cacus." See HERCULES.

Cadalso y Vázquez, José de (1741-82). A Spanish poet, born in Cadiz. He spent his youth in Paris and later traveled extensively throughout Europe. He distinguished himself in the war against Portugal and became colonel. When Gibraltar was besieged, he was killed by a bomb.

His literary work was produced between the years 1771-1774, while he was stationed with his regiment at Salamanca. Here, together with the Augustinian monk Diego Tadeo Gonzalēz, he founded the Salamantine poetic school. Among his works are: the tragedy *Sancho Garcīa Conde de Castilla;* the satire *Los Eruditos a la Violeta,* etc. His writings appeared collectively in 1818 as *Colección de obras en prosa y en verso.*

Caddice Fly, an insect resembling a moth. The caddice fly lays its eggs in water. The larva has the ability of spinning gummy silk. It glues together a case of pebbles, bits of wood, straw, grains of sand, fragments of shell, or anything of the sort inside of which it constructs a silk-lined nest in which to live. Some species leave this home in search of food. Others drag it about as the snail does its shell. One might see hundreds of these cases on the bottom of a brook without suspecting their nature. Some caddice worms, as the larvae are called, decorate their houses by gluing on shells, even of living snails. An astonishing proof of their ingenuity is the construction of funnel-shaped webs, fastened to stones in running water, apparently for the purpose of catching insects. When full grown the caddice worm retires into its silky nest, closes the door for a while, and emerges in due time a caddice fly. It then leaves the water at once, spreads its wings, and sports in the sunshine, a soft-bodied, hairy, moth-like creature. Caddice "worms" devour spawn and the young fry. See INSECTS.

Cade, Jack, in English history, a leader of insurrection. Little is known of his early history beyond the fact that he was an Irishman. In 1450 he placed himself at the head of 20,000 discontented laborers and artisans of Kent and marched on London, leading what would now be called an armed strike. The movement spread over a fourth of England. In response to a complaint setting forth their dissatisfaction with unequal taxes, interference with elections, and extravagance of the courtiers, the king sent an army to disperse them. In the conflict that followed Cade and his men were victorious and entered London. The most obnoxious two of the king's ministers were executed. The king promised redress of past misrule, and issued a proclamation of general amnesty. The working-

men dispersed; but Cade, despite his letter of pardon, was afterward seized and executed. His head was set up on London

This seems merely an aristocratic sneer at a man who was trying patriotically to better the condition of the common people and to abolish shameful abuses in politics. Jack was rough and his methods were rough, but his heart was on the right side.

Cadillac, Antoine de la Mothe (1660-1720), a French soldier and the founder of Detroit, Michigan, was born in Gascony. He was a captain of the French army in Acadia, and in 1694 he was made commander of Michilimackinac by Frontenac. In 1699, Cadillac went to France to enlist the support of Louis XIV. in founding a settlement that would become the commercial center of the Northwest. Louis was pleased with the plan and promised the necessary assistance, but the Canadian officials allowed Cadillac only 50 settlers and 50 soldiers. With these he founded Detroit in 1701. He was governor of Louisiana from 1712 to 1717, when he returned to France.

Cadiz, kăd′ĭz, an important seaport of Spain. It is situated on a narrow tongue of land at the southwestern extremity of Spain, midway between Gibraltar and Portugal. The city is reputed to be handsomely built. The houses are of the flat-topped, Moorish style. The harbor, one of the finest in the world, is well protected by forts. It is the chief naval station of Spain and commercially the center of its colonial trade. The city is well provided with theaters and cathedrals, and has a bull ring capable of seating 12,000 spectators. Cadiz was a flourishing Phoenician colony and was a city of importance under the Romans. At one time Cadiz, or Gades, as it was called, was the chief commercial city of the West. It absorbed the commercial business once belonging to Carthage, and was the chief port on the Atlantic Ocean, the Mediterranean Sea excepted. E. A. Freeman says, "Cadiz has kept its name and its unbroken position as a great city from an earlier time than any other city in Europe." The population, 1920, was 63,101. See SPAIN.

Cadmium, a metallic element. It has somewhat the appearance of tin. It crackles when bent. Its chemical properties resemble those of zinc. In combination with sulphur it occurs in most zinc ores. This combination is known as greenockite, and when prepared artificially is of great use to painters who call it cadmium yellow. This sulphide of cadmium gives paint a bright yellow color of great durability. Cadmium may be obtained usually by roasting zinc-blende, as cadmium is more volatile than zinc. Our commercial supply is obtained chiefly from Belgium and Silesia. An iodide of cadmium is used in photography.

Cadmus, in Greek mythology, the grandson of Poseidon. He was the son of Agenor, king of Phoenicia, and sailed for Greece to seek his sister Europa whom Zeus had carried away. In Greece he met with many adventures. The most noted is that of killing a dragon that guarded the fountain of Ares. At the command of Athene he sowed its teeth in the earth; armed men immediately sprang up and surrounded him, as if to kill him. Athene gave him a jewel to throw among them, whereupon they fell to fighting with each other for its possession. In this way all but five perished. With the survivors, called Spartans, or the sowed, he founded the city of Thebes. To improve the inhabitants of this city, he taught them the Phoenician alphabet.

Cadmus means in Semitic speech "the man of the East," while Europa is the damsel who personifies "the West."—Taylor.

The foundation of the fable of Cadmus is this: Cadmus having slain a famous free-booter that infested Boeotia, his banditti set upon him to revenge their captain's death; but Cadmus sent a bribe, for which they quarrelled and slew each other.—Brewer.

Caedmon, kĕd′mon, an English monk. He is one of the earliest English poets. The Abbey of Whitby stands on a cliff on the northeastern coast of England It was founded by a colony of Irish monks. It was a center of learning and civilization, long before the commercial interests of England had decided upon London as a center of wealth. According to the tradition Caedmon was an ignorant cowherd

in the service of the Abbey. He listened to the singing of the monks and to their playing on the harp with a sad heart, for he had not been educated. One night, as he lay with moist eye on his rude couch, the gift of poesy came to him. He began to sing of the creation of the world and the goodness of God to man. In the morning he told the steward of the gift that had come to him. The steward led him to the Abbess Hilda. The astonished monks considered that the hand of God had been laid upon him. They made him an honored member of their order. The date of his singing is not known, but he preceded the Venerable Bede. He died about 673. His versification was long considered lost, but in 1655 a tenth century manuscript was discovered accidentally. It contained the *Paraphrase,* a biblical history of the creation, the revolt, the fall, the flood, and the exodus. The people of the *Paraphrase* seem to stand half way between the Scandinavian gods and the Puritanic types of Milton's *Paradise Lost.* It is quite possible that Caedmon's *Paraphrase* may have suggested Milton's great work. Resemblances are quite remarkable. Milton appears to have begun his *Paradise Lost* in 1658, three years after the discovery of this manuscript.

The following translation gives some idea of Caedmon's style. The first selection is from the account of the creation. The second describes Pharaoh's death:

There had not here as yet,
Save cavern-shade,
Aught been.
But this wide abyss
Stood deep and dim,
Strange to its Lord,
Idle and useless;
On which looked with his eyes
The King firm of mind,
Beheld those places void of joys;
Saw the dark clouds
Lower in eternal night,
Swart under heaven,
Dark and waste,
Until this wordly creation
Through the word existed
Of the Glory King.
The earth as yet
Was not green with grass;
Ocean-covered,
Swart in eternal night,
Far and wide the dusky ways.

The folk was affrighted,
The flood-dread
Seized on their sad souls;
Ocean wailed with death,
The mountain heights
Were with blood besteamed,
The sea foamed gore,
Crying was in the waves,
The water full of weapons,
A death-mist rose;
The Egyptians were turned back;
Trembling they fled,
They felt fear;
Would that host
Gladly find their homes;
Their vaunt grew sadder:
Against them,
As a cloud,
Rose the fell
Rolling of the waves;
There came not
Any of that host to home,
But from behind
Inclosed them
Fate with the wave.
Where ways ere lay
Sea raged.
Their might was merged,
The streams stood,
The storm rose
High to heaven;
The loudest army-cry.
The hostile uttered;
The air above
Was thickened
With dying voices.
Ocean raged,
Drew itself up on high,
The storms rose,
The corpses rolled.

See MILTON.

Caesar, see'zar, **Caius Julius** (July 12, 100 B. C., to March 15, 44 B. C.), a noted Roman. Caesar's parents were wealthy. He received the usual education of the day in grammar, arithmetic, music, and physical exercises. As a young man he was fond of pleasure but ambitious. Of aristocratic ancestry, he affiliated with his uncle Marius and Cinna, opponents of the aristocracy. On the accession of Sulla to power he ordered the leaders of the people put to death. Caesar was included among the proscribed, but was spared at the intercession of wealthy friends, though Sulla protested that "in that young Caesar there were many Mariuses." Caesar left Rome and served with the army abroad until Sulla's death. He then returned to Rome, and took up politics as a trade.

With a view to pushing his political fortunes he set out in 76 B. C. for Rhodes to study oratory. His vessel was captured by pirates. He was held a prisoner until a ransom of $50,000 was paid. Upon being set free, he manned some ships, assaulted the pirates' stronghold, and crucified his former captors, as he had jestingly assured them, when in their hands, that he would do.

By various arts Caesar rose in popular favor, stepping from one office to another, until he was in a position to form a political coalition with Pompey and Crassus, the wealthiest man of Rome. This combination is known as the First Triumvirate. It was merely a private understanding between the three men by means of which they controlled the most important offices in Rome. In 58 Caesar assumed command of the Roman armies in Gaul (now France). Crassus had military charge of the East and was killed. Pompey began to negotiate with the Senate to diminish Caesar's influence by cutting down his army, and a decree was sent forth commanding him to send home part of his legions or be considered an outlaw. In this emergency Caesar marched on Rome, having, it is said, passed a night debating whether he should cross the Rubicon, a little stream which separated his province from Roman territory proper. As a matter of history, Caesar entered Rome and Pompey fled. After a series of campaigns in Spain, Thessaly, Egypt, and the vicinity of Carthage, Caesar became master everywhere.

The story of his assassination by Brutus, and Mark Antony's speech over his remains are told by Shakespeare in his *Julius Caesar;* but Shakespeare fails to note that an imperial form of government, bearing equally on all, was the nearest approach to a beneficent government possible under the circumstances. Caesar should be held in mind, not as a despot, but as a destroyer of privileges, an equalizer, and a builder. The best treatment of Caesar's life in fiction is in the novel, *A Friend of Caesar,* by William Stearns Davis.

Caesar was probably the greatest Roman that ever lived. He was tall and of a commanding presence, with a pleasing face, and keen, expressive black eyes. He dressed like a prince and had astonishing powers of physical endurance. Few men have excelled in so many different lines of thought. As a statesman he had large views for the future of Rome. As a politician he was shrewd, and knew well how to make petty sacrifices to insure future advantage. As a general his tactics, for the time in which he lived, are commended by military critics. It is said that he knew the name of every petty centurion in his army, and could call out to him by name in the heat of conflict. A leader of the most reckless bravery, his soldiers were willing to follow him anywhere. He was an indulgent commander in trifles, but a strict disciplinarian in all matters pertaining to the safety of the army. In swiftness of military movement and in point of popularity with his men Caesar is often compared to Napoleon.

Caesar dabbled in verse when a youth. While it is true that his writings are not masterpieces in the sense that those of Virgil and Horace are his *Commentaries* on the Gallic War in seven books, and on the Civil War, are considered models. In memory of much needed reform made by him in the calendar, the name of the month in which he was born was changed to Julius, our July. The German "Kaiser" and the Latin "Caesar" are the same word. The natural limit of this article forbids going into the details of the rupture between Pompey and Caesar. Nor can we undertake to draw a line between Caesar's ambition and Caesar's views of an enlightened public policy, but the reader should not miss the central idea that Caesar's contention for power was a part of the never ending struggle of the people against an aristocracy. Pompey was the chosen representative of the Senate, the champion of wealth and privilege. Caesar did not conceive the rights of man as they are interpreted today; but, as contrasted with the aristocratic Senate, he stood for democracy and for a broad, intelligent, vigorous public policy. John Fiske says, "We ought to be thankful to Caesar every day we live."

Pompey's conception was Rome, "Mistress of the World," yet a Rome governed by a coterie of men who plundered the provinces to increase their own wealth. Caesar's conception, we may believe, was a vast empire, justly ruled, an empire in all parts of which thrift, security of life and of property, and equal citizenship should prevail.

As to Caesar's methods, we must realize that he had to fight or go down. It was Pompey or Caesar,—the Senate and Pompey and Rome, or general citizenship, Caesar, and the empire. Caesar grasped the scepter and addressed himself to the problems of equal privileges—equality under Roman law for all parts of the Roman world. Had a man of Caesar's grasp been king of England, with sympathies not confined to London, the American Revolution need not have taken place.

See RUBICON; ANTONY.

Caffeine, kăf-fe′in, the active principle found in coffee. It is precisely of the same chemical composition as theine found in tea. The stimulating effect of these beverages is due to this alkaloid. The per cent of caffeine in coffee usually runs under one, while in tea it averages nearly twice that. In medicine it is used as a stimulant to respiration and circulation, but is so powerful that it should be prescribed with caution. This indicates that care should be exercised to prevent the unreasonable use of tea and coffee, particularly by the young.

Cagliostro, käl-yōs-trō, **Count,** the assumed name of an Italian adventurer, Guiseppe Balsamo (1743-1795.) He was a native of Palermo. The "count" passed himself off as a nobleman of rank. He is notorious for impositions in the capitals of Russia, England, France, and elsewhere. He was imprisoned in the Fleet of London and in the Bastille of Paris. He died in prison at Rome. See DIAMOND NECKLACE AFFAIR.

Caine, Thomas Henry Hall (1853-), an English novelist and dramatist. He was born at Runcorn, Cheshire. His education was received at the Isle of Man and at Liverpool. He became an architect, but abandoned the work for journalism. His early writings were along the line of literary criticism. In 1885 appeared his first novel, *The Shadow of a Crime.* He won no prominent notice, however, until *The Deemster* appeared in 1887. This was the first of the stories dealing with Manx life, in the delineation of which Caine is at his best. *The Deemster* is the story of a youth who, under strong provocation, commits an unpremeditated crime. He is banished in consequence to a remote part of the island. The development of his spiritual nature during this life of isolation is a striking instance of the author's power in character drawing. *The Bondman* appeared in 1890; *The Manxman* in 1894. *The Christian,* published in 1897, gave rise to so much discussion that it became immensely popular. One hundred thousand copies were sold in England and as many in the United States within a year of its publication. It was translated into many European languages. *The Eternal City* appeared in 1901. Another of Caine's books, *The White Prophet,* was dramatized, but upon its production it came under the ban of the English censor from the fact that it placed the English government in an unenviable light. *The Eternal City* was also dramatized and was a great success. Among Hall Caine's more recent works are *The Prodigal Son, My Story, The White Prophet, The Woman Thou Gavest Me, Drama of 369 Days, Britain's Daughters, The Iron Hand, The Prime Minister,* and *the Master of Man.* Caine's ancestors came from the Isle of Man. The scene of many of his stories is laid here, and his descriptions of the life and manners of the Manxmen form an important contribution to literature. See ISLE OF MAN.

Cairn. See BARROW.

Cairo, the capital city of Egypt. It is situated on the east or right bank of the Nile, a few miles above the apex of the Great Delta. Cairo is an Arabian city. The name is Arabian, meaning victory or the conqueror. The exact site of the city is determined by a range of hills, approaching from the direction of the Red Sea. The spur nearest the river is a position of natural military strength. In 640 an Arabic commander, a lieutenant of Ca-

liph Omar, established a town between this spur and the river. This he called the Tent. It is now known as Old Cairo. In 970 a new city was founded a little farther to the north. It was surrounded with a stone wall and a citadel was built. Later the citadel was greatly strengthened, and a well, known as Joseph's Well, was sunk in the solid rock to the level of the Nile.

The present city consists, therefore, of Old Cairo, the New Town, and suburbs. A boulevard runs northwest from the citadel to the heart of the European quarters. This is the chief business street of Cairo The European quarters contain the consulates, hotels, a fine opera house, theaters, English and German churches, and offices. Old Cairo is strictly oriental. The streets are narrow; many of them are filthy, and are lined with mud hovels. The northwest portion of the city lying on the river, rather below the rest of Cairo, forms the port of the city. A railway and wagon bridge crosses the river here.

Across the river from Old Cairo lies the suburb, Gizeh. The government buildings are here. There is also a fine zoölogical garden and museum of Egyptian antiquities. The pyramids of Gizeh lie in plain sight to the southwest. They may be reached by a tramway.

The Nilometer, a building sheltering a graduated post, used officially to note the height of the Nile, stands on a little island in the Nile.

The Mohammedan mosque is the prominent architectural feature of Cairo. There are over 500 in various states of repair. The finest mosque of all is that of Sultan Hassan. It dates from 1357. It is celebrated for the "grandeur of its porch and cornice and the delicate honeycomb tracery which adorns them." It is surmounted by a lofty minaret. From an educational point of view, Cairo is the center of the Moslem world. The chief theological school of the Moslem world is attached to the Azhar Mosque. In 1906 there were 317 professors and 9,758 Moslem students. The Moslem burying ground, just without the city, is adorned with numerous mosques. Cairo is the seat of a patriarch of the Coptic Church and of a patriarch of the Greek Church as well. It is interesting to know that the Copts use a calendar differing by 284 years from the calendar we use.

Cairo is connected with Alexandria, near one of the mouths of the Nile, by a railway 150 miles in length. There is railway communication also with Suez and with upper Egypt. A fresh-water canal leaves the Nile at this point and cuts across country to Suez. Cairo does a large business in gold and silver ornaments, in rugs, carpets, saddles, swords, daggers, boots and shoes, and clothing. The city is headquarters for a large trade with the natives of the upper Nile, and the Bedouin people of the Sudan. Large parties are organized at Cairo to visit Mecca. The population of Cairo and its suburbs in 1921 was 1,263,292. It is the largest city, not only in Egypt, but in all Africa.

See NILE; ALEXANDRIA; PYRAMID.

Caisson, kās′sŏn, a substructure used in building the piers of bridges. If an engineer desires to build a pier in water, in midstream, for instance, there are several devices for getting a secure foundation. It will not do to begin building on the mud of the river bottom, for the pier would be almost certain to settle to one side and become unsafe, if it did not fall. One method of reaching a deep foundation below water and mud is the employment of a caisson.

A caisson may be likened to an enormous, water-tight tub, built bottom upward where it is desired that the pier shall stand. The caisson may be built on land and towed to place, or it may be built on the spot. In either case, the bottom must be enormously strong—for the bridge builder proceeds to build his pier on the caisson. As the caisson sinks into the oozy bed of the river, air is forced into it from above by a powerful pump. In this way the chamber, as the space below the bottom is called, is prevented from filling with water and mud. Workmen in this chamber labor with pick, shovel, and wheelbarrow, excavating so as to allow the caisson to sink deeper and deeper. The earth is sent up through a central shaft. A sand pump is used for the pur-

pose. Air pressure is depended upon to keep water out; or, indeed, water may be pumped out as is done in digging a well. As fast as the caisson sinks the masonry above is built up so as to be above the level of the water. When the caisson reaches bed rock, or clay that may be depended upon to support the pier, the chamber and shaft are filled, usually with concrete, and the work is complete.

The shaft through which workmen go up and down, and through which the excavated material is removed, is provided with air locks. The air pressure in the chamber is necessarily very great. On coming out of the caisson workmen remain for a time in an anteroom, an air lock, under pressure midway between that of the caisson and the outer air. Notwithstanding this precaution workmen are prostrated, not infrequently bleeding at the nose, with pain in the stomach, and neuralgia. Sometimes paralysis sets in and death may occur.

Bridge caissons may be of enormous size. A caisson built in constructing the bridge over East River, New York, was 102 feet in diameter. It was sunk to a foundation 172 feet below the surface of the river.

See COFFERDAM.

Calabash. See GOURD.

Calais, kȧ-lā′, a seaport town of France. It is situated on the Strait of Dover, at the junction of several canals, and is the terminus of a railroad leading to Paris. It is at the narrowest part of Dover Strait and is about twenty-three and one half miles from the English port of Dover. The harbor may be entered at all stages of the tide. The greater part of the travel between London and Paris, as well as between London and other continental cities, goes by way of Dover and Calais. Nearly a quarter of a million of passengers cross the strait at this point annually. A submarine telegraph connects the two towns, and there is talk of a railroad tunnel beneath the water. Calais is an important commercial town of 73,000 people. Supplies for the London markets, including about 5,000,000 dozen eggs a year, form a considerable part of the export trade. Calais was the last French territory held by the English.

In the long wars between the English and the French Calais was considered the key of France. In 1347 it was captured by Edward III after a siege of eleven months. The story runs that he promised to spare the people of the city on the condition that six of their principal citizens should come out to him with ropes around their necks. He ordered that their heads should be cut off at once, but his queen, Philippa, fell at his feet and begged their lives. Calais was considered the "brightest jewel in the English crown." A boastful inscription was placed over one of the gates:

> Then shall the Frenchmen Calais win
> When iron and lead like cork shall swim.

Nevertheless, Calais was recaptured by the French in 1558, in Queen Mary's reign. She considered that England had suffered a national misfortune. "When I die," said she, "Calais will be found written on my heart."

Calamus. See SWEET FLAG.

Calaveras. See SEQUOIA.

Calceolaria, kăl-se-o-lā′rĭ-ȧ (Latin, little shoe), a plant from the Andes of Peru and Chile, belonging to the same family as the toad-flax, mullein, and monkey flower. The flowers are saccate, much like a lady's slipper in outside appearance. The calceolaria makes a fine house plant. The colors are rich and intense, varying from yellow to purple and violet, pure or often dotted with brown spots.

Calcium, kăl′sĭ-ŭm, an important chemical element. It ranks fifth among the elements in point of abundance, making up about four per cent of the earth's crust. It forms an important part of lime, limestone, marble, plaster of Paris, chalk, shell, pearl, bone, egg shells, coral, and glass. It is present in all hard water. It was obtained free from other elements in 1808 by Sir Humphry Davy. In a pure condition it is a silver-white metal with a brilliant luster. Ordinarily, however, it is of a light yellow color. It is harder than lead and somewhat softer than gold. Calcium is a caustic. It unites chemically with nearly all of the elements, possibly all except argon.

Calculating Machine, a device for performing the simpler arithmetical operations mechanically. The simplest and most ancient is the abacus, still in use by the Chinese. Various types have been constructed from mere adding machines to the most intricate and complicated, by which may be performed almost any operation involving numbers. Pascal, the eminent physicist, invented one in 1642. The common slide-rule would come under the head of a calculating machine. Under the name of adding-machine they have recently been greatly perfected, and now find a place in almost all business offices. Anyone may operate such a machine with but little experience, as it has a keyboard like a typewriter, with rows of keys in columns from 1 to 9. The pressing of a key marks the figure on a slip of paper. Other keys are for addition, subtraction, and in the larger machines for multiplication. The most improved types are operated by electricity, as are also some cash registers which have automatic adding attachments. Calculating devices have also been made as a part of typewriting machines. This device is very effectively used in the making out of statements.

Calculus, as commonly used, means that branch of higher mathematics which deals with quantities as capable of continuous growth by infinitely small values known as differentials. The investigation of the infinitesimal changes of variables whose relations are known is called differential calculus. When the variables themselves are to be found from the behavior of their differentials, we have integral calculus. This theory was discovered independently and almost simultaneously by Newton and Leibnitz, but the terms employed by the latter are generally used in the subject today. Calculus has been of the greatest service in the development of mathematics and its application to the problems of mechanics.

Calcutta, a noted city of British India. It is situated on the east bank of the Hoogly, a short cut from the Ganges to the sea, and is about eighty miles from the Bay of Bengal. Its wharves extend for ten miles along the Hoogly. The water front is well built with warehouses and places of business. The river is crossed by a pontoon bridge. The government house occupies six acres. Fort William, begun by Governor Clive, has been completed at a cost of $10,000,000. There are fine parks and drives, tramways, and electric lights. Outside of the modern city lie extensive native suburbs of mud huts, little better, travelers assert, than pigsties. Water obtained from the Hoogly, twelve miles up, is filtered in huge tanks. Such provision has been made for sewers as is possible in a city built on a dead level only a few feet above the river. The death rate has been reduced to about 30 per 1,000 inhabitants annually. Cholera is said never to be absent from the filthy native quarters. Rainy July and August are the healthful season; midwinter is the worst. The annual rainfall is about sixty-six inches; the mean temperature for the year about 79°.

Calcutta is the center of an extensive railway system. It is the chief port of foreign commerce, exceeding even Bombay in this respect. There are seldom fewer than 200 ships at the wharves. Calcutta is reputed to have the largest tea warehouse in the world. The export trade of the city amounts to about forty-three per cent of that of all India. It is carried on chiefly with London by way of the Suez Canal. It exceeds $250,000,000 a year. Opium is exported to China. The principal articles of export are cotton, cotton-seed, jute, wheat, tea, rice, indigo, leather, hides, furs, coffee, lac, and wool. The principal imports are cotton and woolen cloth, yarn, iron goods, and machinery. The population in 1921 was 1,263,292.

See BOMBAY; INDIA; BLACK HOLE; OPIUM; BRAHMANS.

Caledonia, an ancient name for north Scotland. The term is found in Pliny's *Natural History* and in the *Agricola* of Tacitus of 96 A. D. Tacitus describes a battle between the Roman forces and 30,000 Caledonians. They are described as fighting with bows, swords, and small shields. Agricola erected a line of forts between the Friths of Clyde and Forth with the intention of defending the remainder of the

island against the Caledonians. The name persists chiefly in poetry. A canal in the counties of Inverness and Argyle is called the Caledonian Canal. It extends from Murray Frith to Loch Eil, over sixty miles distant. It was open to navigation in 1823. It shortens the journey around the northern coast of Scotland several hundred miles. Ships of 600 tons can pass through for it is 120 feet broad at the surface, 50 feet at the bottom, and 17 feet deep. The part that is wholly artificial is 23 miles in length. At its highest point, Loch Oich, it is 94 feet above sea level.

Calendar, the orderly record of time. About the only units of time in use among savage people are the day and the moon. Such a moon is the rice moon, or moon for gathering wild rice. Another may be the sore-eyes moon, when the smoke of the tepee and glare of the snow bring on sore eyes. Religious ceremonies based on the time of the moon carried forward a time record, based on the month, far into civilization. Civilization reckons time in years. As the phases of the moon do not come out even with the end of the year, a year composed of new moons is out of harmony with a year based on the seasons.

We trace our calendar to the Egyptians. Whether they understood the revolution of the earth about the sun or not cannot be determined, but they noted the return of the sun to a certain position at regular intervals. This they fixed at 365¼ days, less a fraction. They established a system of leap years and possessed a calendar of months. This Egyptian calendar was adopted by the Romans. The pontiffs who had charge of festivals and religious observances had charge also of the official calendar. In 45 B. C. the Roman calendar had run behind nearly three months. The spring equinox was scheduled to come off in June. Caesar reformed the calendar by decreeing that the year 46, "the last year of confusion," should be prolonged to 445 days. He further ordered that three years out of four should have 365 days, and that each fourth year,—that is, each year divisible by four,—should have 366 days. This is called the Julian Calendar. According to it, each century is about three-fourths of a day too long. The new century should begin a day sooner three centuries out of four, a loss of three days every 400 years. In this way each century began farther and farther behind time. Pope Gregory, finding that the church festivals were noticeably changing in season, decreed, 1582, that the day following the fourth of October of that year should be recorded the fifteenth instead of the fifth day of the month; and to avoid future difficulty he further decreed that the last year of each century three times out of four should not be a leap year; or, put in another way, that only such century years be reckoned leap years as are divisible by 400. Accordingly, 1700, 1800, and 1900 had but 365 days, but the year 2000 will be assigned 366 days. This is known as the Gregorian Calendar.

The Gregorian Calendar was adopted in all Catholic countries and by most Protestant countries at once. England waited until 1751; then fell in with a statute that the day following the second of September be reckoned the fourteenth instead of the third. The Gregorian Calendar is followed by the commercial world; that is to say, everywhere save in Russia, in which the Greek Church adheres to the Julian Calendar for fear of impiety in setting forward church festivals. The Russian dates are thirteen days behind ours. When Alaska was taken over the difference in reckoning was added, so that the official records of Alaska would indicate that it never had a certain thirteen days at all.

In France during the Revolutionary period, the National Convention enacted in November of 1793 that the year should be divided into twelve months of thirty days each with five days of merry-making at the end of each year. The new calendar was dated back to September 22, 1792, the day on which the new republic took form. This calendar was followed for about eight years until abolished by order of Napoleon. The names of the months were as follows:

October,	Vendemiaire,	vintage month.
November,	Brumaire,	foggy month.
December,	Frimaire,	sleet month.
January,	Nivose,	snowy month.
February,	Pluviose,	rainy month.

March	Ventose,	windy month.
April,	Germinal,	bud month.
May,	Floreal,	flower month.
June,	Prairial,	meadow month.
July,	Messidor,	harvest month.
August,	Thermidor,	heat month.
September,	Fructidor,	fruit month.

Among the odd suggestions may be mentioned that of Auguste Comte, 1849, who proposed that the months bear the names of great men as Moses, Caesar, Shakespeare, and St. Paul; and further that each day of the year be known by the name of some noted person as well. Dates thus written would be Romulus, 1905, Socrates, 1872, or such a battle was fought on Plato, 1863.

Calendering, a mechanical process by which cotton and linen textiles are "finished," that is, given a smooth surface, and, if desired, a glaze. Three ends are to be attained by calendering. First, the fabric is to be made smooth, without fold or wrinkle. Second, the threads are to be compressed until they lose their round shape and become flat. Thus they are brought into closer contact and an appearance of strength and firmness is given to the fabric. At the same time all knots and lumps caused by imperfections in the thread are flattened and smoothed. The third purpose is to give a luster or glaze to the surface of certain materials.

Calends, the first day of the Roman month. The nones were the ninth day before the ides, both days included, and fell on the fifth day of the month, save in March, May, July, and October, when the nones fell on the seventh day. The ides were the eighth day after the nones, and fell on the thirteenth day of the month, save in March, May, July, and October, when they fell on the fifteenth day. Dates were reckoned backward, so many days before the ides, the nones, or the calends. The second of August was called the fourth day before the nones of August; the sixth day of August was the eighth day before the ides of August; and the fourteenth day of August was the nineteenth day before the calends of September. The calends, nones, and ides were reckoned as the first day in each case. Thus the last day of each month was called the second day before the calends of the following month. See CALENDAR.

Calgary, the largest city in Alberta, and the largest city in Canada between Winnipeg and Vancouver. In its early days Calgary gave little promise of its future greatness. The building of the Canadian Pacific Railway led to the founding of a settlement here in 1883. At first its name was spelled *Calgarry,* a word of Gaelic origin meaning clear, running water. At the census of 1891 Calgary was a prosperous frontier town of 3,800 people, and a decade later it had grown only to 4,800. But the first twenty years of the twentieth century saw a tremendous increase, the census of 1921 giving it a population of 63,305.

Calgary is the natural trading center of a vast farming and stock-raising region, and is also the supply center for the mining districts of the Rocky Mountains. The city is almost exactly midway between Winnipeg and Vancouver, and has direct rail connection with these cities. All three of the Canadian transcontinental lines were built through Calgary. This city receives the raw products of the mines, forests and prairies—horses, cattle, sheep, grain, fur, coal, lumber—forwards a part of them to other centers, but retains an ever-increasing part for its own industries. About 150 industrial plants and over 200 wholesale establishments have located here. The railways have made Calgary a divisional point, with one of the largest car-repair shops in the dominion.

The city is laid out, in the main, in rectangles, with wide streets. Important buildings are the store of the Hudson's Bay Company, the Canada Life Assurance Building, and the Canadian Pacific's Palliser Hotel. The provincial normal school and institute of technology are here. The street railways, water works, electric power and light plant, and asphalt paving plant are municipally owned.

Calhoun, kăl-hoon′, **John Caldwell** (1782-1850), an American statesman. He was born near Abbeville, South Carolina, of Scotch-Irish parentage. He was graduated at Yale and studied law. He was sent to Congress by his native state in 1811. He

served his state and country forty years in the House, in the cabinet, in the vice-presidential chair, and in the Senate. He advocated the War of 1812 with England. Although elected vice-president on the Jackson ticket, he was opposed to Jackson's removal of the United States funds from private banks. He also opposed Jackson's spoils system,—that of giving office in reward for political service.

Calhoun was a staunch free trader. When the protective tariff of 1828 was enacted, he was the leader of South Carolina in the famous Nullification Act. The tariff placed a duty on manufactured goods coming into this country. It was framed to protect the manufactures of New England, rather than the agricultural and cotton producing people of the South. Calhoun asserted that it was not only the privilege, but the duty, of South Carolina to prevent this act from taking effect within her borders. President Jackson declared that South Carolina should obey the laws of the nation. Carolina was equally agreed that she would not do so in this particular. A compromise measure, introduced by Henry Clay, to gradually reduce the tariff averted the difficulty.

Calhoun was the chief exponent of the doctrine of state sovereignty. He maintained that a state dissatisfied with the Union had a perfect right to withdraw peaceably, if possible; by force, if necessary. Although this doctrine had been enunciated by Massachusetts early in the history of the country, Calhoun is commonly regarded as its chief champion.

He was a man of good stuff and uncompromising integrity. His official career is consistent and honorable from beginning to end. His personal character has been praised by none more highly than by Daniel Webster, his great opponent in debate. Calhoun is considered the greatest man produced by South Carolina. His grave is near his native city.

See WEBSTER; CLAY; NULLIFICATION; JACKSON, ANDREW; SOUTH CAROLINA; CHARLESTON.

Caliban, kăl′ĭ-ban, the deformed and repulsive slave of Prospero, in Shakespeare's *Tempest.* Caliban is the opposite of Ariel in the same play. As Ariel is a spirit of the air, Caliban is a spirit of the earth. He is a sort of man-beast, brutal, coarse, malicious, devoid of moral sense; but he is not vulgar. The difference between Caliban and depraved human nature is clearly seen when he is associated with the drunken and vulgar characters, Stephano and Trinculo. The character of Caliban has furnished material for much learned discussion; possibly, however, not enough to warrant the statement made in the following quotation from Furness:

> If the depth of an impression made by an imaginary character may be gauged by the literature which that character calls forth, then must Hamlet and Falstaff admit Caliban to a place between them. An eminent professor (Wilson) has devoted a stout octavo volume to the proof that in Caliban we find the exact "link" which, in any scheme of evolution, is "missing" between man and the anthropoids; the late and honored Mr. Robert Browning has given utterance to the theological speculations which he imagined might have visited Caliban's darkened and lonely soul; and a brilliant member of the French Institute, of world-wide fame, has written a philosophical drama bearing the name of *Caliban.* No other unreal character, except the two I have mentioned, Hamlet and Falstaff, has called forth such noteworthy or such voluminous tributes.

As Schlegel says, "The delineation of this man monster is throughout marvellously profound and consistent," and, notwithstanding all, "the modesty of nature" is not outraged.—Smeaton.

Calico, a light cotton cloth of the class called print. It is chiefly used for women's and children's dresses and aprons. The name is from Calicut, a town in India, noted at one time for the manufacture of this kind of cloth. As distinguished from gingham, and other cloth dyed in the thread, calico is woven in white and is printed in desired colors on one side of the web. As distinguished from other grades of printed cotton, dimity, percale, and cretonne, calico is a coarse but light fabric. It is finished usually with starch which gives it a gloss and an appearance of firmness and "body."

The Dutch East India Company introduced calico into Europe. The art of making it gained a footing first in Holland. In 1676 calico printing became established on the Thames, near London; in 1738,

at Glasgow, where it is still a staple manufacture; and at a later date at Birmingham. The first cotton mills were erected in the United States at Pawtucket, Rhode Island, in 1790.

There are two classes of calico printers —those who weave their cloth and print it, selling their product directly to jobbers, and those who merely print the pattern at piece-price. There are two grades of calico, called 64×64 and 56×60. These figures indicate the number of threads to the inch. The first number in each set gives the number of threads in the warp, and the second number gives the number in the weft. The webs are inspected carefully for flaws, and are then stitched together in lengths of 300 yards ready for printing, which involves the various processes of singeing, bleaching, and shearing, besides the actual imprinting of patterns.

The variety of colors, tints, shades, and combinations is limited apparently only by the limits of human ingenuity. The preparation of the dyes or colored inks is a science. If a visitor were to go through any of the large cotton mills, he would come upon the chemist and his vats, and might learn much of madder styles, steam styles, indigo styles, turkey red styles, bronze styles, aniline colors, and of mordants, baths, acids, dyewoods, extracts, chromates, clays, pigments, and bleaches. The chemist in calico works needs to know not only how to make his dyes give the exact colors desired, but he must be a student of all possible coloring materials. He must know how to make his colors withstand washing, and what ingredients will give the desired color without injury to the cotton.

After printing, the cloth passes through certain finishing processes. It is starched, evened, and pressed. It is then folded into laps and is ready for market.

Calico Bass, a fish somewhat resembling the sunfish, of mottled green color, which is found in the waters of the Mississippi valley and the Great Lakes. It has a length of 12 inches and weighs about 2 pounds. It is also called grass bass and bar-fish.

California, the most southerly of the Pacific states. Area, 158,297 square miles, equivalent to that of New England, New York and Pennsylvania. It is exceeded in size by Texas only. The extreme length from northwest to southeast is about 775 miles, or more than four-fifths the distance from Chicago to New York. The greatest width is about 235 miles. Within this vast territory there is the greatest diversity of scenery, rainfall, temperature, soil and productions. It is difficult to characterize a state in which a single county has mountain summits above the snow line at one end and orange groves at the other. It is difficult to name a fruit, flower, vegetable, or field crop found elsewhere in the United States that does not find a suitable locality somewhere in California.

Surface and Drainage. California is a land of contrasts. Within the borders are the highest altitudes and the lowest depressions in the United States. Two parallel mountain ranges, the Coast Range and the Sierra Nevada, extend through the state from the northwest to the southeast. The Coast Range is really a system and consists of a number of ranges some of which run to the coast, breaking off abruptly in steep cliffs and lending variety and beauty to the surrounding scenery. The Range is characterized by low elevations the summits varying from 3,500 to 8,000 feet excepting a few prominent summits—San Bernardino, 10,650 feet; San Jacinto, 10,805 feet—and a few other prominent peaks in the southern part of the Range. Toward the south the Range branches into the San Bernardino, the San Jacinto, the Santa Ana and the San Gabriel Range. It is within these ranges that the highest altitudes occur. The Sierra Madre, west of the San Bernardino, is a lesser range which becomes more prominent as it extends northward until it reaches the Oregon boundary.

Parallel with the Coast Range and extending along the eastern side of the state for about 400 miles is the Sierra Nevada or Snow Range. Beginning near the southern boundary of Inyo County the Sierra Nevada extends northward to the

valley of the Pitt River which separates it from the Shasta Range. The area covered by these mountains is about four times that of the state of Massachusetts. The system consists of a massive upheaval of clustered peaks and averages fifty miles in width. It forms the western border of the Nevada plateau and the eastern slopes are abrupt. The western slope, however, is more gradual and because the rainfall and the snow are received on this slope it is the source of many mountain streams. Some of these, particularly the Merced (Yosemite), Kings and American rivers have formed canyons which have become widely known for their scenery. The entire range is characterized by ruggedness and high altitudes, Mt. Whitney, 14,502 feet, being the highest point in the United States proper. Other summits exceeding 14,000 feet: Fisherman's Peak, 14,448 feet, and Mt. Cocoran, 14,093 feet. There are numerous summits ranging in altitude from 11,000 to 13,000 feet, and the average altitude of the range is 10,000 feet. Numerous small glaciers extend above the snow lines and hundreds of mountain lakes are found in this region, the most famous of these being Lake Tahoe on the Nevada border.

The Siskiyou Range at the north, to which Mt. Shasta belongs, and the Kern River Mountains at the south, connect the Sierra Nevada and the Coast Range. Near Mt. Shasta , Lassen Peak, until 1914, was supposed to be an extinct volcano, but from July 8 to July 18 of that year it sent forth columns of steam which sometimes rose 10,000 feet above the summit, and the following year the farms and forests on the north side of the mountain were seriously damaged by a river of mud flowing from its crater.

Lying between these mountain systems, the Coast Range and the Sierra Nevada, is the great valley of California, having a length of 400 miles and an average width of 80 miles. This is the largest valley west of the Rocky Mountains and one of the most fertile regions in the world. The valley slopes gently from each end toward the center and it is divided into two basins, that of the Sacramento and that of the San Joaquin rivers. Part of these streams are fed by tributaries that rise among the melting snows of the Sierra Nevada mountains. They unite and enter Suisun Bay in an estuary about a mile wide, thence their waters flow into San Francisco Bay and find an outlet to the Pacific through the Golden Gate. The surface of both basins is diversified by hill and valley though no high mountains occur.

Southern California. The Kern River Mountains form a dividing line between Southern California and that portion of the state to the north. The rivers of Southern California drain into inland lakes or are lost in the desert sands. The most important of these is Lake Tulare, a stagnant body of water 25 miles wide (at some times during the year only) dries up during the summer in Tulare County. The western portion of Southern California includes the minor ranges of the coast system. East of these mountains are the Mohave and Colorado desert regions almost entirely without water and without rainfall. Eighty miles south of Mt. Whitney is Death Valley, whose lowest point is 276 feet below sea level. The valley is a barren desert without water. It received its name because, during the early days of immigration, several parties were lost in attempting to cross it. South of Death Valley in Imperial County lies Imperial Valley, 287 feet below sea level. These are the two greatest depressions on the American continent. Imperial Valley receives water from the Colorado River and large areas of it are in a high state of cultivation.

Climate. California extends from the 42 parallel on the north to a short distance south of the 33 parallel latitude. This great extent north and south combined with the varied elevation gives the state an unusual range of climates. On the summits of high mountains snow remains throughout the year, but with this exception the climate is mild, and in the lower regions of the southern part of the state, semi-tropical. There are two seasons, the wet and the dry, the former occurring during the winter. The rainfall varies from 80 inches in the northwestern part of the state to less than 5 inches in the desert regions of the south. North of San

Francisco there is sufficient rainfall for agricultural purposes although in many localities irrigation is practiced because the rain is not distributed over the growing season. In Southern California irrigation is everywhere necessary. California is widely known for its delightful climate which is free from extremes and unusually healthful. Climatic conditions have brought into the state thousands of settlers who came to improve their health or to escape the discomforts of a more rigorous climate in other parts of the country.

Forests. The forest area of California is 44,700 square miles, almost equal to the area of Pennsylvania. Within this area parks and forest preserves covering 24,000,000 acres have been established. Some of these, notably the Yosemite, General Grant National Park and Sequoia National Park, are public pleasure grounds and are annually visited by thousands of tourists. General Grant and Sequoia parks are the home of the famous big trees. (See Sequoia. The most valuable timber trees include the redwood, western white pine, Douglas fir, sugar pine, spruce, cedar and oak. In the southern half of the state there are numerous groves of eucalyptus which was imported from Australia and the pepper tree is frequently found in parks and private lawns. Lumbering is the third industry in the state in the value of its products. The chief lumber centers are located in the dense forests in the northwestern counties.

Minerals and Mining. Minerals occur in large variety and great abundance. The discovery of gold in Sutter's Creek in 1848 was an epoch making event in the history of the state and nation. Within a year the population of the territory was increased to over 100,000, giving California a percentage which enabled her to become a state long before the other territories bordering upon the Pacific. For many years California was the leading gold producing region of the world and it is still the leading state in the Union in the production of this metal. In 1922 the output of gold was valued at $14,900,000. Silver now leads copper in the value of its output. Lead, zinc and quicksilver are mined in great quantities but petroleum is the most valuable mineral product. The output for 1922 was 139,000,000 barrels of 42 gallons, giving the state second rank in the production of this fuel. The oil fields are in the southern part of the state, chiefly on the wsetern side of the San Joaquin Valley and along the coast. Building stone in great variety, clay, borax and other minerals are also found.

Agriculture. In 1920 32 per cent of California's population was rural, the number of farms had increased from 88,197 in 1910 to 117,690 in 1920, a gain of 29,493 or 33.4 per cent during the decade. Agriculture is the leading industry and everything that can be grown in a temperate and semi-tropical climate is produced within the state. The soil is unusually fertile and wherever there is sufficient moisture abundant crops are raised. The leading cereal crops in the order of their production are barley, wheat, corn and oats. California is the leading state in the production of barley, beans and hops, and it ranks third in the production of rice. Climatic conditions are ideal for truck farms because in many localities two or three crops can be raised in a year. The state produces vegetables in sufficient quantities to supply local demands and permit the shipping of large quantities to eastern markets. Cotton is an important crop in the Imperial Valley, the output varying from 75,000 to 100,000 bales annually. The climate is ideal for the production of olives and many large orchards are found in the central and southern part of the state.

California is the leading fruit state of the Union and the foremost citrus fruit region of the world. In the northern half of the state deciduous fruits, pears, peaches, plums, apples, cherries and other small fruits predominate. In Southern California two-fifths of the oranges of the world and three-fifths of the production in the United States are grown. Lemons in large quantities are grown, and grapefruit and citron are also produced in great abundance, although Florida excels in the production of grapefruit. The United States Department of Agriculture assisted the set-

tlers in Coachella Valley in sarting the culture of date palms and in 1922 250,000 pounds of dates were produced. Seedling palms have been planted in Fresno and other counties and in the near future the date crop of this region will be important. Grapes are grown throughout the state and in Fresno County is the largest raisin-producing region in the world. Ninety-five per cent of the English walnuts grown in the United States come from Southern California, and large quantities of almonds are produced in the central part of the state.

The fruit industry of California is successful because of its thorough organization. All fruit is marketed through associations such as the "Sun-Maid" Raisin-Growers' Association at Fresno; The California Fruit Growers' Exchange, with headquarters at Los Angeles; and the California Walnut Growers' Association. These organizations properly grade and sell the productions of the farms at prices named by the organization and not by the buyers from commission houses.

Live Stock. Cattle, sheep, horses and mules are raised in large numbers. Dairy husbandry supplies the demands of the state, and beef cattle and swine are raised in sufficient numbers to make meat packing one of the important industries. Butter-fat production for the year 1922, 105,446,-108 pounds, an increase of 6,000,000 pounds over 1921 production. Value of all dairy products for year 1922 approximately $97,125,398. The poultry industry is also important.

Manufactures. There were in 1922 approximately 12,000 manufacturing establishments within the state, giving employment to 300,000 persons. The capital invested exceeded one and one-third billion dollars and the value of the manufactures produced was about two billion dollars. The leading industries in the order of the valuation of their production are canning and preserving, refining petroleum, shipbuilding, the manufacture of lumber and timber and lumber products, slaughtering and meat packing, and the manufacture of foundry and machine shop products, and the making of moving pictures, which has become one of the leading industries. Lesser industries are the manufacture of flour and other grist mill products, the bakery industry, the manufacture of butter, cheese and condensed milk, repairing and construction of railway cars and locomotives, and the manufacture of beet sugar.

Transportation and Communication. California has over 8,393 miles of railroad, not including sidings. The state is served by the Southern Pacific, the Atchison, Topeka & Sante Fe, and the Los Angeles & Salt Lake systems. Numerous branches from the main lines of each system place all important towns and settlements within easy reach of railway communications. An electric interurban system extends from San Francisco to all surrounding cities and as far as Sacramento, and another more extensive system connects nearly all the cities of Southern California within a radius of one hundred miles with Los Angeles. This is the most extensive and complete interurban system in existence.

California is noted for its excellent roads. The improvement of highways began in 1910 when the state voted $18,-000,000 in bonds for the development of its road systems. In 1916 a second issue of $15,000,000 was made, and in 1919 an amendment to the constitution providing for the issue of $40,000,000 additional bonds was voted by the people. The road system is approaching completion and when the task is finished California will be second to no state in the Union in its mileage of concrete roads. The Pacific Highway, extending the length of the state from north to south, forms a part of the system.

California has a coast line exceeding one thousand miles in length. Upon this coast there are two of the largest and best landlocked harbors on the Pacific Ocean—San Francisco Bay and the bay at San Diego. Another important harbor is located in San Pedro Bay and protected by an extensive breakwater constructed by the United States government. This is the harbor of Los Angeles. Ships from the Orient and other parts of the world which come through the Panama Canal ply regularly between San Francisco, Los Angeles and the Orient and Europe. Other lines

ply between these cities and San Diego and ports on the western coast of South America. In addition to this a large coastwise traffic is carried on by lines plying regularly between San Francisco, Los Angeles and San Diego, and between San Francisco, Portland and Seattle.

POPULATION. In 1920 California had a population of 3,426,861, which was a gain of 44.1 per cent in the decade 1910-1920. The density of population in 1920 was twenty-two to the square mile. Over one-third of the population is rural. The Japanese number approximately 72,000. Only three cities in the state—Los Angeles, San Francisco and Oakland—have a population exceeding 100,000.

EDUCATION. California is one of the most progressive states along educational lines. The public school system is in charge of a state board of education with a state superintendent at its head. The standard of qualification for teachers is higher than in most other states. A compulsory school law requiring attendance from eight to sixteen years inclusive is in force throughout the state. Wherever practicable, consolidated rural schools are being established and schools in the remote districts are taught by as well qualified teachers as those in the more densely populated regions. Excellent systems of graded schools are found in all cities and towns and the high school system is so organized as to bring these institutions within reach of all who desire to attend them. There are state normal schools at Chicho, Fresno, Humboldt, San Diego, San Jose and Santa Barbara, the last being an institution devoted to the manual arts and home economics.

The University of California and Leland Stanford University rank among the foremost institutions of the country. Other colleges of importance are the University of Southern California at Los Angeles, St. Ignatius University at San Francisco, St. Mary's College at Oakland, University of Santa Clara at Santa Clara, College of the Pacific at Stockton, and Mills College for Women at Oakland. A large number of other colleges and schools of higher education are maintained by the various religious denominations and so distributed over the state as to provide all pupils with an opportunity for securing higher education.

The University of California has the largest enrollment of any state university in the country. In 1922 the registration in all departments was 29,296 students and the faculty included 1,153 members. Including those taking extension courses made the grand total 40,054. The university was opened at Oakland in 1873 but later removed to Berkeley, where it is now accommodated in a group of the finest educational buildings in America. The main university at Berkeley maintains colleges of arts and sciences, commerce, agriculture, mechanics, mining, civil engineering and chemistry, and a school of architecture, jurisprudence and education, and the university extension division. The schools of medicine, law and dentistry are in San Francisco. The university farm is at Davis and the graduate school of agriculture at Riverside. A center of the university extension division is maintained at Los Angeles to accommodate students in that part of the state. In 1922 the endowment and trust funds amounted to $8,407,775. The income (July 1, 1921, to June 30, 1922) was $9,089,618.83.

The observatories on Mt. Hamilton and Mt. Wilson are among the most widely known in the world and they are contributing much to the progress of astronomical science. There is a state school for the deaf, dumb and blind at Berkeley, and a home for feeble-minded children at Eldridge.

GOVERNMENT. The present constitution was adopted in 1879. In 1911 twenty-one amendments were adopted, one of the most important being that providing for the initiative and referendum and that for women's right to vote on an equal basis with men. The executive department of the government is vested in a governor, lieutenant-governor, secretary of state, comptroller, treasurer, attorney-general and surveyor-general, each of whom is elected for four years. The legislature consists of a senate of forty members, elected for four years, and an assembly of

eighty members, elected for two years. There is no restriction upon reelection. The county is the unit for local government.

HISTORY. White men first entered California from lower California and Mexico and the region was visited by Spanish explorers as early as 1523. The name was originally applied to lower California; its origin is uncertain. The first real explorations in the state were in 1542 and 1543 when Cabrillo visited the coast and islands in the region of Santa Barbara. The first mission was established at San Diego by the Franciscans in 1769. From that date until 1823, when the last station had been established at Sonoma, the work of these missionaries among Indians produced remarkable results. Until the close of the Mexican War California was a part of Mexico. In 1846 a small troop of Americans, under the leadership of John C. Fremont, captured the town of Sonoma and proclaimed the independence of California. Monterey and San Francisco were seized the same year by Commodore Sloat of the United States navy.

The discovery of gold at Sutter's Mill in 1848 caused a large influx of people, chiefly from the eastern part of the United States, but to some extent from all countries of the world. The territory increased in population so rapidly that in 1850 California was admitted to the Union as a free state. During the Civil War the state adhered to the Union. The completion of the Union Pacific railroad in 1869 placed the state in direct communication with the eastern part of the United States, and from that time to the present the development of California has been continuous.

The influx of Chinese and Japanese has led to some difficulty with China and Japan. However, since this was an international matter, it was adjusted by the United States government. One of the most disastrous earthquakes in history visited San Francisco in 1906, destroying a large area in the heart of the city and causing untold loss and suffering. However, the damage was repaired and the city now is in a more prosperous condition than ever before. In 1915 the International Pacific Exposition was held in San Francisco, drawing to that city a large number of visitors from all parts of the country. At the same time an industrial exposition, representing the industries of California, was held in San Diego.

STATISTICS. The following statistics are the latest to be had from trustworthy sources:

Land area, square miles	155,652
Water area, square miles	2,645
National forests, area acres	24,000,000
Irrigated area, acres	4,219,040
Population (1920)	3,426,861
White	3,264,711
Negro	38,763
Japanese	71,952
Chinese	28,812
Indian	17,360
Chief Cities:	
Los Angeles	576,673
San Francisco	506,676
Oakland	216,361
San Diego	74,683
Sacramento	65,857
Berkeley	55,886
Number of counties	58
Members of state senate	40
Members of house of representatives	80
Salary of Governor	$10,000
Representatives in Congress	13
Assessed valuation of property	$5,135,984,563
Bonded indebtedness	$ 117,197,907
Farm area, acres	29,365,667
Improved land, acres	11,878,339
Corn, bushels	4,176,000
Wheat bushels	15,308,000
Oats, bushels	5,250,000
Potatoes, bushels	10,260,000
Barley, bushels	36,864,000
Oranges, boxes	16,500,000
Almonds, tons	8,000
Walnut, tons	27,000
Raisins, tons	220,000
Grapes (wine), tons	420,000
Grapes (table), tons	240,000
Peaches, tons	420,000
Hay, tons	5,235,000
Beans, bushels	4,778,000
Cotton, pounds	40,562,000
Wool clip, pounds	14,000,000
Fresh fruit (deciduous), cars.	91,093
Fresh fruit (citrus), cars	39,254
Domestic Animals:	
Horses	363,000
Mules	61,000
Milk cows	645,000
Other cattle	1,435,000
Sheep	2,402,000
Swine	876,000
Manufacturing establishments	11,942
Capital invested	$1,233,480,273
Raw material used	$1,218,858,518
Operatives	243,692

Output of manufactures	$1,981,204,701
Petroleum, barrels (42 gal.)	139,000,000
Gold, value	$ 14,900,000
Silver, ounces	3,200,000
Copper, value	$ 3,035,100
Salines (including borax, potash, salt, soda)	$ 2,750,000
Brick, cement, bldg. stone, value	$ 33,000,000
Miles of railway	8,393
Teachers in public schools	31,101
Pupils enrolled	695,151

California, Gulf of, an arm of the Pacific, which extends between the peninsula of Lower California and the mainland of Mexico. It was at first known as the Sea of Cortéz, having been discovered by his followers and explored by himself. It is 700 miles long, and has a width of from 30 to 150 miles. The Colorado flows into its upper end, and from the east the Altar, Sonora, Yaqui, Mayo and Fuerte empty into it. The shores are paralleled by highlands, which form an almost unbroken mountain wall and the coast line is indented by numerous small bays. The gulf has a depth of from 600 to 6,000 feet, and is dotted with many islands, the largest of which are Ángel de la Guarda and Tiburón. On the west coast are the ports of San Felipe, San José and La Paz; on the east, Mazatlan and Guaymas. Pearl fishing is profitable on the west coast. See Colorado River; Salton Sea.

California, Lower, or **Old,** a peninsula in southwestern North America, forming a part of Mexico. California bounds it on the north, the Pacific on the west, and the Gulf of California and the Mexican state of Sonora on the east. Its length is about 750 miles; breadth varying from 30 to 140 miles, and area 58,343 square miles. Its surface is to a large extent mountainous, owing to its being practically an extension of the Sierra Nevada and Coast ranges. There are several mountain peaks here, the highest, Santa Catalina, having an altitude of over 10,000 feet. An eastern coast range borders the Gulf of California, while that on the west borders the Pacific. In the southernmost part of the peninsula there is an enormous mountain mass, some of the peaks rising to a height of 8,000 feet, as in San Lázaro. Though the coast is frequently indented, there are but few good harbors. The chief islands are Ángel de la Guarda, off the eastern coast, and Cedros, on the opposite western coast. In the western part of the peninsula the climate and vegetation are much like those of the southern part of California; there is little rainfall, taking the high temperature into consideration. In the southwest portion there are a few streams which help to irrigate the soil. In the extreme south there are large areas of territory that are uninhabited. The chief cities are La Paz and Ensenada de Todos Santos. The territory of Lower California is self-governing, having a governor and a legislature. The estimated population of Lower California is 53,254.

Caligula, kȧ-lĭg′ū-lȧ, **Caius Caesar Augustus Germanicus** (12-41 A. D.), the third emperor of Rome. He was a nephew of the emperor Tiberius, whom he succeeded. He was twenty-five years old when he came to the throne. At first his rule was mild, and he won popularity by his lavish generosity, but he shortly began to display a cruelty and capriciousness which can scarcely be explained except by the theory that he was insane. His relatives and subjects were murdered or banished without cause. He amused himself while dining by having his victims tortured to death in his presence. He gave a banquet on a bridge he had built over the Bay of Baiae, and closed the festive scene by having some of the guests thrown into the sea. He declared himself a god, and made his horse a priest. He was at last assassinated by a conspiracy of his citizens. The name Caligula means Little Boot and was a nickname given him in camp on account of the soldier's boots he wore.

Caligula, Palace of, the residence of Caligula on the Palatine Hill, overlooking the Forum. It was an extension, on the north, of the palace of Tiberius. The upper part has entirely disappeared, and the ruins found over the Via Nova, thought to have been the palace of Caligula, are now believed to date from the second or third centuries. A cryptoporticus, about 140 meters long, led from the structures of Caligula along the east side of the palace of Tiberius to the House of Livia, and by a branch, to the House of Augustus, and here Caligula was murdered.

Caliph or **Calif,** kā′lĭf, a name given to the successor of Mohammed in the government of the faithful and in the high priesthood. The name is Arabic and means successor or deputy. The power of the caliph was absolute in both civil and religious matters, as long as he ruled in conformity with the Koran and traditions. The caliph must be a male adult, a freeman, and sane. It was expected that he be a learned divine, a powerful ruler, a just person, and that he belong to the Koreish, or tribe to which Mohammed himself belonged. Some authorities claim that he must belong to the family of Mohammed, and consequently maintain that since the first five caliphs none have been entitled to the name, but are merely governors.

The caliph in his office of high priest began the public prayers every Friday in the chief mosque, and delivered the sermon. He was obliged to lead the pilgrims to Mecca in person and to march at the head of the armies of his empire. He rode to the mosque mounted on a mule, and the Seljukian sultan held his stirrup and led the mule until notified by a sign from the caliph that he might himself mount on horseback. From a window of the caliph's palace hung always a piece of black velvet thirty feet or more in length called the "caliph's sleeve." This was kissed daily with great respect by the grandees of the court.

The succession to the caliphate often occasioned much excitement. There were various insurrections and dissatisfaction among individuals. Many caliphs met with violent deaths. In 1517 the caliphate passed over to the ninth of the Ottoman dynasty of Turkish sultans, and the title is still vested in the sultan of the Ottoman Empire. The Mohammedan princes appoint a particular officer in their respective dominions to sustain the sacred authority of the caliph. In Turkey he is called a mufti; in Persia, a sadne.

Soon after the battle of Tours, little more than a hundred years after the death of Mohammed, the world of the Moslems was rent. Islam extended from Persia and the far East, along the southern coast of the Mediterranean, and across the Straits of Gibraltar into Spain. Geographical conditions and personal ambition split this extended empire into two divisions, an eastern and a western, just as similar factors split Christendom into an eastern and a western empire.

Calixtus, the name of three popes.

Calixtus I., Bishop of Rome, was born a slave, but was made head of the church in 219. According to some accounts, he suffered martyrdom in 223.

Calixtus II., Guido of Vienne, Pope from 1119 to 1124, was the son of the Count of Burgundy. He was elected in 1119, and in 1120 he expelled from Rome the antipope, Gregory VIII. In 1122 he concluded with Henry V. of Germany the famous Concordat of Worms.

Calixtus III., Alonzo de Borgia, Pope from 1455 to 1458. His ambition was to institute a crusade against the Turks, but he failed. He was the uncle of Rodrigo Borgia, father of Lucretia and Caesar Borgia. Rodrigo Borgia became Pope as Alexander VI.

Calla, a favorite house plant of African origin. Though called a calla lily it is not a lily at all, but a relative of jack-in-the-pulpit. A column of flowers, known as a spadix, rises in the center of a cup-shaped leaf which is prolonged at one end to a tip. This leaf or spathe is really no part of the flower, but its spotless, lily-like whiteness, in most species, has given the name. One kind, very numerous in the Nile, is called the lily of the Nile. The spathe of one species is pink, and there is a black calla as well. A small greenish calla grows wild in the tamarack swamps and streams of eastern North America, as well as in Europe and Asia. Calla plants for the house should be started in late summer from dry tubers. Botanists do not class the house plants among the callas.

Calla′o, the chief seaport of Peru. Latitude 12° S. The town is situated on a commodious harbor, and is commanded by Callao Castle, the last fortification to be held by Spain in South America. Callao has been bombarded by Chile and by Spain. In 1746 an earthquake wave carried ships ashore, landed a frigate far inland, and

drowned 4,600 people. The foreign trade of Peru centers at Callao. On an average two ocean going steamships land daily. Callao is the starting point of the Callao Oroya Railway, the loftiest railway in the world. The chief exports are cotton, sugar, leather goods, gums, guano, wool, metals, and minerals. Over half a million dollars' worth of cocaine is prepared and exported. Callao is headquarters for quinine, alpaca, and llama wool. About one-fourth of the total business of Callao is transacted with the United States. A half of it goes to London and other British ports. The population is about 52,483.

Callimachus, ka-lĭm′a-kŭs, an Alexandrian critic, poet, and grammarian. He was born at Cyrene, Africa, during the third century B. C. Under Ptolemy Philadelphus, Callimachus became chief librarian of the Alexandrian Library. He left six hymns to the gods and many epigrams. Of his elegiacs, however, which were his most famous writings, only fragments remain. Callimachus was one in whom "ingenious, elegant, and harmonious versification took the place of higher poetry." He may be regarded as the first representative of the learned poetry of Alexandria. See ALEXANDRIA.

QUOTATIONS.

A great book is a great evil.

He but sleeps
The holy sleep, say not that the good man dies.

All hail! Thrice hail! We pray thee to dispense
Virtue and wealth to us, wealth varying
For virtue's naught, mere virtue's no defense
Then send us virtue hand in hand with competence. —*Hymn to Jove.*

Callimachus takes up this part of earth,
A man much famed for poesy and mirth.
—*Epitaph of Callimachus, written by himself.*

Calliope, kăl-lī′ō-pē, in Greek mythology, the muse of epic poetry. She was the daughter of Zeus and Mnemosyne, the goddess of Memory, and the mother of Orpheus. Calliope presided over eloquence. She was represented wearing a crown of laurel, holding in one hand a trumpet, in the other an epic poem. The literal meaning of the name Calliope is beautiful voiced, whence the name of the musical instrument (commonly pronounced kăl′lĭ-ōp) beloved of the circus goer.

Callirrhoe, ka-lir′ō-ē, a name of frequent occurrence in Greek legend. Perhaps the most noted was Callirrhoe, the daughter of Achelous, a river god. She became the wife of Alcmaeon. Alcmaeon had slain his mother Eriphyle in obedience to an oracle. He then left Argos that he might be purified from his crime in the water of the Achelous. Here he met and married Callirrhoe. She knew that Eriphyle had once possessed a magic peplus and necklace, and she was determined to have them for her own. Alcmaeon had left them in Arcadia. Much against his will he went after them to please his wife, but on his return was waylaid and killed. Another Callirrhoe was a maiden of Calydon. She was wooed by Coresus, the priest of Bacchus. She rejected his suit. Bacchus, in punishment, sent madness upon the people of Calydon. An oracle declared that the plague could not be averted unless Callirrhoe was sacrificed upon the altar. But Coresus, about to perform the sacrifice, was moved by love of Callirrhoe and gave himself in her stead. Touched by his devotion, she took her own life near a well, which was called thereafter by her name. The name has been given by botanists to several species of poppy mallows, rose, red, cherry, lilac, and white, gathered by children from Minnesota to Texas. See ALCMAEON.

Callisto, in Greek mythology, an Arcadian nymph. Zeus admired Callisto and the jealous Hera changed her into a bear. Callisto was very unhappy in this new form. She was afraid of the other wild beasts, even of other bears, and she was lonely. At last she saw her own son, Arcas, approaching. She sprang forward to embrace him; but Arcas, not recognizing his mother, was about to slay her with his spear, when Zeus in pity snatched them up, and changing Arcas too into a bear, set them both in the sky, where they formed the constellations of the Great and Little Bear. Hera was incensed that such an honor should come to Callisto as a result of her punishment. She went to Tethys and Oceanus, who ruled the ocean, and begged them to help her. They could do little, but they forbade the Great Bear and the

Little Bear to come into their waters. So these two constellations move round and round in the heavens; but never sink, as do other stars, below the ocean.

There is considerable diversity in the stories of Callisto told by different writers. The foregoing account is Ovid's version of the tale. According to others, Callisto was an attendant of Artemis and was changed by her into a bear, and her son given to Maia to bring up. Another story is that Artemis herself killed the bear Callisto, and that she was transplanted to the skies as the constellation of the Great Bear, while Arcas was changed to Arcturus in the constellation called Boötes, or the Watcher of the Bear. This is consistent with the story of Cynosura, who was transformed into the Little Bear.

Milton in *Il Penseroso* alludes to the fact that the constellations of the Bear never disappear below the horizon:

> Let my lamp, at midnight hour
> Be seen in some high, lonely tower,
> Where I may oft outwatch the Bear.

See CYNOSURA.

Call of the House, a roll-call in a parliamentary body to ascertain what members are absent without leave. In the United States Congress a call may be ordered at any time. In the British Parliament the rules require that notice of several days be given. A member of Congress may be expelled for neglect to attend. In this way even a minority may require the presence of enough members to do business.

Calmucks, or **Kalmucks,** a nomadic people of Mongolian stock, inhabiting parts of Russia, Siberia, and China. They are active and well proportioned, with short chin, high cheekbones, upturned nose, oblique eyes, and scanty beard. They raise cattle, sheep, and horses. They move from place to place with change of season. Their homes are conical felt houses, which they set up in rows when they encamp. The Calmucks appeared on the Volga in 1630. They plundered for a time, but succumbed to Russian authority. A century later, 1771, to be more exact, one of their chieftains became dissatisfied and organized an exodus at a given date. They were off,—120,000 men, women, and children,—with their horses and herds for China. The Cossacks hung on their rear and other tribes harassed them on the march. A wretched horde reached the banks of a Chinese river and were settled by the Chinese emperor. The story is told graphically in De Quincey's *Flight of a Tartar Tribe.* A considerable section of the Kalmucks was unable to cross the Volga in time to join the flight. Their descendants still dwell on the Volga. The Russian and Chinese Calmucks are estimated variously at from 70,000 to 200,000.

Calomel, a white powdery compound of mercury and chlorine. It is without smell or taste, and cannot be dissolved in water, alcohol, or ether. It is prepared by heating corrosive sublimate with mercury and common salt. The drug is highly poisonous. In minute doses it is used extensively in medicine for inflammation of the serous membrane, and as a substitute for Epsom salts. Veterinary surgeons use it as a caustic to cleanse wounds, and for thrush in the frog of a horse's foot. See MERCURY; MEDICINE.

Calor'ic, a term applied to the fluid formerly considered the basis of heat. A hot body was thought to have considerable caloric in it, while a cold body had but little. Caloric was considered as being matter but without weight. This materialistic theory of heat was finally overthrown by the experiments of Rumford and Davy, who clearly showed that heat which could be produced in unlimited quantities by friction could hardly be matter. The term in a general sense is often used as synonymous with heat.

Cal'orie, the unit of heat in scientific usage, defined as the amount required to raise the temperature of one kilogram of water from 0°C to 1°C. The heat required to raise 1 gram through the same range of temperature is called a lesser calorie.

Calumet, the pipe of peace used by the Indians of North America. The bowl was made of some sort of soapstone, or of red pipestone. A long reed served for a stem. On all ceremonial occasions the calumet was passed from hand to hand. When met to make a treaty, the warriors sat

in a circle. The pipe was passed around gravely; each warrior took a few whiffs as a sign of friendship. When the terms of the treaty had been arranged the pipe went around from hand to hand again. Each warrior or chieftain took a whiff or two to indicate his agreement to the terms. If he passed the pipe without smoking he declared his dissent. In this way a vote was taken. The calumet was also passed around the circle as a token that warriors going out to battle would stand or fall together.

> Break the red stone from this quarry,
> Mould and make it into Peace-Pipes,
> Take the reeds that grow beside you,
> Deck them with your brightest feathers,
> Smoke the calumet together,
> And as brothers live henceforward!
> —Longfellow, *The Song of Hiawatha.*

Calvary, Mount, a small eminence near the city of Jerusalem on the road to Damascus. It is noted in sacred history as the place of the crucifixion of Jesus Christ. In the Hebrew original, the word was Golgotha, signifying a skull. It was the common place of execution for criminals. See JERUSALEM.

Calve, Emma (the stage name of Emma de Roquer), (1864-), a famous dramatic soprano and one of the great operatic stars of her time, was born in France. Her rich and vibrant voice, of a contralto-like quality in its lower tones, had in its prime a range of two and a half octaves, clear and even throughout. This, with her beauty, fiery temperament, and charm of manner has made her a favorite with opera goers of both continents. Her great role was *Carmen*, in which she was peerless. She also achieved a signal success as *Santuzza* in *Cavalleria Rusticana.* She created the leading roles in *Chevalier Jean* (1885), *La Navarraise* (1895), *Messaline* and *Sapho* (1900), *La Navarraise* and *Sapho* being written especially for her. After 1909 Mme. Calve practically gave up operatic work, devoting herself to the concert stage. She has appeared in the United States and Canada, and in all the principal cities of Europe and South America.

Calvin, John (1509-1564), a religious leader of the sixteenth century. A native of Picardy. As a lad he was so fond of Latin and argument that his young friends nicknamed him the "accusative case." Calvin was well educated. He was intended for the law, but was attracted by the new doctrines of the Reformation and began to preach in Paris. When active repressive measures were taken by Francis I, Calvin fled in the disguise of a workingman—finally to Geneva, where, with the exception of a short banishment spent at Strasburg, he spent the rest of his life preaching and writing. His particular doctrines are known as Calvinism. They were held by the Church of Scotland, the Puritans, and by the various branches of Presbyterianism everywhere. One of these doctrines is predestination, as opposed to the Arminian doctrine of free will. Calvin was the author of several books.

Calydonian Hunt. See MELEAGER.

Calypso, kȧ-lĭp′so, in Greek mythology, a sea nymph. She was variously said to be the daughter of Atlas, of Nereus, and of Oceanus. She dwelt alone on the wooded island Ogygia, remote from both gods and men. During his wanderings after the Trojan War, Ulysses reached this island. He was hospitably received by the nymph, who straightway fell in love with him and strove by every art she knew to keep him from leaving her. She promised him perpetual youth and immortality. For seven years she was successful in holding the recreant. Then Zeus interfered and commanded Calypso to send Ulysses on his way. Having fitted him out with a raft, provisions, and a breeze to waft him on, she sorrowfully bade him farewell. Later, when Telemachus, son of Ulysses, went in search of his father, he, too, stopped at Calypso's isle. Again Calypso tried to hold her guest, but Minerva, who, disguised as Mentor, accompanied Telemachus, influenced him to withstand Calypso's allurements. The two escaped from the island by jumping from a cliff into the sea and swimming to a ship which lay becalmed at a little distance.

Camass, a liliaceous plant of North America related to the scilla of European gardens. There are several species. The name is an Indian word applied to a

species found in the moist meadows of the Rocky Mountain region and westward. It has long, thin leaves and a scape, terminating in an open raceme of blue flowers. The Indian squaws collect the bulbs in large quantities for food. Their chief rival is a pouched gopher called locally the camass-rat.

Cambric, properly a fine variety of plain woven linen. For more than a century, however, the name has been given to a thin calendered muslin, originally made in Scotland in imitation of the linen cambric. In 1520 a fine linen cloth was produced at Cambrai, or Cambray, France. It was called cambric from the name of the city. A sixteenth century historian tells us that it was "so fine that the greatest thread was not so big as the smallest hair that is." It was much used for fine ruffs, kerchiefs, shirts, and undergarments. The first cotton imitation was called cambric-muslin. Cambric is finished frequently with a luster. It is thinner and finer than common muslin. It is used for women's underwear, infants' clothing, etc. A cheap cotton fabric dyed in plain colors is also called cambric. It is used for linings and is of two varieties, kid-finished and glazed. The latter is called sometimes paper cambric. It is put up usually in rolls, as a fold is apt to form a permanent crease. See CALENDERING.

Cambridge, kām′brĭj, a city of Massachusetts. It joins Boston on the north, being just across the Charles River. Cambridge is noted as the seat of Harvard University, and of Radcliffe College for women. It has been the home of many literary and influential people and has many points of historic interest to the visitor. The old elm under which Washington took command of the American Army is here; the house which was Washington's headquarters and later the home of the poet, Longfellow; Lowell's home, Elmwood; and Mount Aubùrn Cemetery, one of America's most beautiful burial places. Cambridge has many large and important manufactories. Among its products are glass, shoes, rubber goods, soap, carriages, candles, chemicals, ink, blacking, furniture, pianos and organs, telescopes, boilers, and steam engines. There are mercantile houses, printing houses, and book binderies. Here was published the first book ever brought out in the United States. The schools of Cambridge rank among the best in the country. There is a large public library. Other places of interest are the Harvard Observatory and the botanical gardens. The population of Cambridge in 1920 was 109,694.

Cambridge University, one of the great English institutions of learning. It is situated at Cambridge in the shire of that name on the River Cam, about fifty miles north of London. It rivals Oxford. The town has a population of about 40,000, but it is given over chiefly to the university. There are seventeen affiliated colleges. The first, that of St. Peter's, was founded in 1284; the last, Downing, in 1800. The officers, fellows, and students of the entire university number about 4,000. The affairs of the university are administered by a chancellor and a senate. Each college has its private rules and regulations, but, in general, the college organization includes eight orders.

1. The head or master, provost or president, as he is variously called.
2. Fellows,—from twelve to sixty graduates who receive an allowance from the college funds of from $750 to $1,250 a year. They are privileged to reside or to travel. The award is usually for the period of six years.
3. Noblemen graduates,—professors, and masters of various departments who do not receive fellowships.
4. Bachelors of the various departments.
5. Fellow commoners,—students of means who pay large fees. They are entitled to wear silk robes and to dine at the fellows' table. The sons of noblemen and of wealthy men are ranked here.
6. Scholars,—students who receive a small award from the funds of the college for proficiency in scholarship.
7. Pensioners,—the main body of students.
8. Sizars,—needy students receiving assistance from various funds established for the purpose.

A master of arts of Cambridge is called a cantab, an abbreviation for the Latin name of the university.

The students of each college reside within its buildings or in lodgings approved by authority. Each college is governed by its head and fellows. A member of the faculty is not necessarily a member of the governing body. The university library contains half a million volumes. The various colleges have fine laboratories and adequate equipment for the work undertaken. To the American, however, the various rules, and especially the favors accorded wealth, seem very undemocratic and irksome. The atmosphere at Cambridge is decidedly classical. Under certain restrictions women may attend lectures, and, if successful in their examinations, may receive certificates of scholarship, but are not granted degrees. The university sends two members to Parliament. Cambridge, Massachusetts, the home of Harvard University, was named for the old town of Cambridge.

Cambyses, kăm-bī′sez, a king of the Medes and Persians, from 529 B. C. to 522 B. C.: date of his birth is unknown. He was the son of Cyrus the Great, whom he succeeded on the throne. In 525 B. C. he invaded and conquered Egypt, but expeditions against the Ammonites and Ethiopians failed. Cambyses seemed to lose his mind over these disasters. At least his display of vindictiveness and cruelty thereafter has been accounted for in that way. At last revolution broke out; Cambyses, marching from Egypt against the usurper of his throne in Persia, was accidentally wounded on the way and died in Syria. Some accounts state that he took his own life.

Camden, a city of New Jersey and the county seat of Camden County. It is situated on the Delaware River opposite Philadelphia. Camden is an important shipping point, and has extensive ship yards. There are also foundries and manufactories of considerable importance, including among their products boots, shoes, oilcloths, paints, chemicals, textile fabrics and machinery. Camden is on the Atlantic City, the West Jersey & Seashore, and the Pennsylvania railroads. Its population in 1920 was 116,309.

Camel, the most important domestic animal of southwestern Asia. Naturalists consider the camel the most ancient cud-chewing animal in existence—an older type than the giraffe—and place it at the end of the cud-chewing group nearest the thick-skinned animals. The camel family contains two groups. The Bactrian or two-humped camel and the Arabian or one-humped camel belong to the Old World; the llama and the alpaca, the quanaco and the vicuna of the Andes, belong to the New World. The camel's colt stands about three feet high and attains a shoulder height of about seven feet at maturity. Its duration of life is forty years or over. The camel does not refuse green pasturage, but it exceeds a goat in ability to live on the dry, prickly shrubs of the desert.

Camels are wonderfully well fitted for life in hot, sandy countries. Unlike other cud-chewing animals, the camel's foot is only partially cloven. Instead of a split foot shod with two hoofs, like those of a deer or an ox, the two toes of a camel rest on a broad, leathery, elastic pad that serves as a kind of "sand shoe," and enables the camel to walk with ease over the soft sands of Arabia and the Sahara, where a hoofed animal sinks ankle deep at every step. The extreme tips of its toes are separated, and are shod with reduced hoofs much like claws. The camel's backbone is entirely regular. Its hump is not a deformity of the spine but a storehouse. When forage is plentiful, the camel stores up fat and muscle in its hump to be drawn on for strength during long journeys or time of food scarcity. During hard trips these humps become empty, and must be restored by three or four months of rest and abundance before severe service is again undertaken. Long, thick, silky eye-lashes serve as a protection against the white glare of the sand and keep out whirling dust. The camel's nostrils are long, narrow slits. During a sand storm a camel lies down, stretches out his long neck on the sand, closes his eyes and nostrils, and waits for the suffocating dust cloud to blow past. Another wonderful provision of nature is a system of folds or water pouches in the walls of the first and second stomach. The largest of these pockets is not over three inches in diameter, but they

Dromedary.

CAMELS.

Two-humped Bactrian camel.

Alpaca. Llama. Vicuña.

ANIMALS OF THE CAMEL FAMILY.

are numerous and, when filled from the stomach by a drink at some oasis, they will serve their owner at need for a journey of four or five days to the next water supply. The strength of a camel's back is proverbial. Their ordinary capacity for carrying burdens is twice that of a packhorse, and the Bactrian camel is credited with carrying 1,000 or even 1,500 pounds for short distances. Of the two camels, the Arabian is lighter and better adapted to the deep sand and extreme heat of Syria and Africa; the Bactrian is a coarser, stronger animal, better fitted for the mountain passes, stony pathways, and cold winters of central Asia.

Camels are uncouth, awkward, and ill-tempered. They lack the docility of the ox, and do not possess the intelligence and the affectionate disposition of the horse; but without them large tracts of the Old World would be uninhabitable. Their milk and the flesh of the young serve the Arab for food; he uses their dung for fuel; he manufactures rugs, ropes, garments, and tents from their hair; and he uses their hide for water bags and furniture. In a land where boats are unknown and roads are impossible, the Arab carries his family and his wares on the backs of camels. Thus this faithful animal furnishes food, fuel, shelter, and transportation for millions of people.

Prior to the Civil War a number of camels were imported for use in transporting army supplies in the "Great American Desert." The experiment was reported successful. Some descendants of these camels, escaping the perils of Apaches and mountain lions, are, it is said, still to be found in Arizona, but the assertion rests on doubtful authority. Camels have been introduced into the arid regions of southern and western Australia, where they are used for beasts of burden. They carry bales of wool to market.

The distribution of camels, Arabia and Morocco not included, is about as follows:

Russia in Europe	225,550
Spain	2,250
British India	442,301
Cyprus	11,169
Russia in Asia	678,622
Algeria	211,279
Egypt	40,000
Sudan	132,116
Tunis	147,229
German Africa	52
Australia	4,065
Total	1,884,583

See ALPACA; LLAMA; DROMEDARY; CARAVAN.

Camel's Hair, the woolly hair shorn from the neck and back of the camel. There are two distinct grades. The under hair is fine. It is about one inch long, and is soft and silky. The outer hair, which completely covers the under hair on the neck and hump, is coarse, and is from three to four inches long. In Arabia and other eastern countries, camel's hair is woven into a variety of stuffs, and forms the chief material for clothing and housing the inhabitants. The natural color is a light brown or tan, which is one of the distinguishing characteristics of genuine camel's hair goods. The fiber imported into America and Europe is used principally for the manufacture of fine dress goods and winter underwear. The long and short hairs are sometimes separated, but more frequently they are spun together. When the cloth is woven, some of these longer hairs become untwisted and appear on the surface, giving a shaggy appearance. Genuine camel's hair fabrics are rarely seen in the American market. Two varieties of so-called camel's hair cloth are common in our markets. One is a thick, shaggy fabric, retailing at about two dollars the yard. It is manufactured usually from fine sheep's wool and may or may not have long hairs interspersed on the surface. The other is a thin, fine, wool textile named from its resemblance to the imported cashmere shawls, improperly called camel's hair shawls, and only an imitation of the material of these shawls. See CASHMERE SHAWL.

Camelot, kăm′ē-lŏt, a legendary city in England where King Arthur's palace was located. The Knights of the Round Table met here. There has been much dispute as to the site of Camelot. Shakespeare located Camelot in Wales, for the Earl of Kent in Shakespeare's *King Lear* says:

> Goose, if I had you upon Sarum plain
> I'd drive ye cackling home to Camelot.

This has been interpreted as allusion to the fact that large quantities of geese were bred on the moors in Somersetshire. Consequently, Shakespeare is quoted as authority for locating the fabulous city in Somersetshire. Others identify it with Winchester. Caxton located it in Wales.

Camelot is best known through Tennyson's use of it. The following description in prose was found among the poet's papers after his death:

> On the latest limit of the West, in the land of Lyonnesse, where save the rocky Isles of Scilly, all is now wild sea, rose the sacred Mount of Camelot. It rose from the deeps, with gardens and bowers, and palaces, and at the top of the mount was King Arthur's hall and the holy minster with the cross of gold. . . . The Mount was the most beautiful in the world, sometimes green and fresh in the beam of morning, sometimes all one splendor, folded in the golden mists of the West. But all underneath was hollow and the mountain trembled, when the seas rushed bellowing through the porphyry caves; and there ran a prophecy that the mountain and the city on some wild morning would topple into the abyss and be no more.

The Lady of Shalott begins with the lines:

> On either side the river lie
> Long fields of barley and of rye,
> That clothe the wold and meet the sky;
> And thro' the field the road runs by
> To many-tower'd Camelot.

The name Camelot is of constant recurrence in the poem. In the *Idylls of the King,* it is thus described:

> Camelot, a city of shadowy palaces
> And stately, rich in emblem and the work
> Of ancient kings who did their days in stone;
> Which Merlin's hand, the Mage at Arthur's court,
> Knowing all arts, had touch'd, and everywhere
> At Arthur's ordinance, tipt with lessening peak
> And pinnacle, and had made it spire to heaven.

See ARTHUR.

Cameo, a gem cut away so that the figure stands out in relief. It is the opposite in this respect to the intaglio in which the figure is a depression. If a cameo be pressed against wax it forms an intaglio, and, conversely, an intaglio pressed on wax forms a cameo impression. Cameo cutting is believed to have been practiced by the ancient Babylonians and Phoenicians. A cameo in an English collection, called the Cupid and Psyche, is believed to have been cut by a Greek not long after the death of Alexander the Great. The material most frequently used is the onyx and various kinds of shell. Artificial cameos are made of glass and other material. Florence, Italy, is celebrated for cameos and intaglio cutting.

Camera, the term usually applied to the instrument by means of which objects or scenes are photographed, or reproduced in picture form by the aid of light. Its earliest form was the camera obscura (Latin, dark chamber) which was invented by Hooke in 1679, in the form of a box with inclined mirror and a piece of ground glass or paper on which the images of outside objects could be traced. In modern photography, the camera is made usually in the form of a box in two parts, connected by an extensible bellows-like arrangement of leather, rubber, or cloth, serving to adjust the focus, and having one or more lenses fixed in the front. But cameras are made in a great variety of shapes and sizes, according to use, such as the portable or pocket camera, commonly called kodak; the copying camera, portrait camera, landscape camera, etc. Many different forms of lenses, some of highly specialized types, are also used. Provision is made for inserting in the back of the camera plate-holders or carriers containing the dry or wet sensitive plates, or the paper or celluloid films, etc., on which the photographs are taken. Most cameras are made so that the operator may adjust the focus by observing the image of the object on a ground-glass screen before the plate or film is exposed to the light. The proper adjustment being made, the light is admitted for the required time, which may be only the fraction of a second, by a mechanical device called the shutter, controlled by a lever, a pneumatic bulb, or other means.

For out-of-door work, the essentials of a camera are portability and rapidity of adjustment; in the professional studio a rigid base and adaptability are required. A view camera does not require a long bed or base, as the pictures made are generally on a reduced scale; but a camera designed for copying or enlarging needs a

long bed, for the distance from the lens to the ground glass must be as many times greater than the distance between the original object and the lens as it is desired to enlarge the picture. Even the smallest and least expensive cameras are equipped with a "finder," but in the case of some hand cameras the ground glass is omitted and the proper focus obtained by reference to a graduated scale on the bed, showing the foci for different distances. Modern film photography has made the demand for hand cameras universal.

Motion Picture Camera. This camera is a development of recent years which has changed the social habits of millions of people, and brought opportunities for entertainment, hitherto undreamed of, to the masses in all countries of the civilized globe. It is a camera of special construction, containing mechanism for alternately exposing and moving, at a high rate of speed, a ribbon-like film of sensitized celluloid, together with a revolving shutter which prevents the entry of light through the camera lens to the film while the latter is being shifted from one position of exposure to another. In making the photograph, the film is unwound by a hand mechanism from a reel that usually contains 1,000 feet of the sensitized celluloid ribbon, with perforations near the edges that fit the cogs of sprocket wheels in the machine which move the film along at rapid intervals as required. Sixteen pictures are usually taken on each foot of film, each separate photograph being about three-quarters inch deep and about 1 inch wide. Such a series of photographs of any scene or object in motion, when suitably enlarged and reproduced in like succession by projection on a screen, gives a lifelike representation of the original object and constitute a "moving picture."

The camera film, after exposure, is of course a negative of the scene. This being developed, a positive is made by contact printing on a similar kind of film, and the latter is then ready to be sold or rented to moving-picture theaters for exhibition.

The projection machine used by exhibitors was developed by Edison, Lumière, and others about 1893. It allows the photographed images on a transparent film such as is described above, to be enlarged and projected by the lenses and light of a suitable lantern upon a screen. When projected at the rate of 16 to 20 pictures a second, the impression received by the human eye from one picture does not die out until another succeeds it, and this results in the illusion of actual motion of the figures on the screen. The projection lantern, like the camera, has a shutter which interrupts the light for a brief interval of time, sufficient to move the film into the next position, and thus avoids the blurring or flickering of successive impressions to the eye of the observer. To reproduce the original motion of objects, it is necessary to project the successive pictures at about the same rate of speed as they were photographed. Comedy effects are often produced by projecting them faster or slower, or by running the film backward. See Photography; Moving Pictures.

Camera Obscura, an apparatus for sketching landscapes and other large objects. It consists of a box painted black inside, a mirror set at an angle of 45°, a ground glass screen above the mirror, and a lens, such as is used in a photographic camera. The image is thrown upon the mirror, which reflects it upon the screen, where it can be sketched with a lead pencil. The camera obscura should be used in a dark room, or a black cloth should be thrown over the head and shoulders of the one making the sketch. Formerly, this instrument was in general use by illustrators of newspapers and magazines, but it has been superseded by the photographic camera. At present its chief use is as a toy to interest boys and girls.

Cameron, Richard (1648-1680), a Scottish covenanter. When the Scottish Stuarts on the throne of England turned to the Catholic faith, he resisted their authority openly, and took to the hills and mosshags at the head of his followers. The government put a price on his head. He and his supporters were surrounded in a moss in Ayrshire and cut to pieces. Cameron's head and hands were taken to

Edinburgh. Under the name of the Cameronians his followers were long a separate sect in Scotland. The reformed Presbyterians claim to be the lineal successors of the Cameronians. See COVENANTERS; PRESBYTERIANS.

Cameron, Simon (1799-1889), an American senator. He was a native of Pennsylvania. He learned the printer's trade, and in 1822 edited a paper in Harrisburg, supporting the candidacy of Andrew Jackson. He was elected to the United States Senate in 1845. In 1856 he joined the new Republican party formed after the repeal of the Missouri Compromise, and was again elected to the Senate. He was secretary of war, March, 1861, to January, 1862; minister to Russia, 1862-63; and again a member of the Senate 1866-77. In 1877 he resigned and was succeeded by his son, J. Donald Cameron.

Camoens, kam'ō-ĕns, **Luis de** (Portuguese spelling, camoes), (1524-1579), the most celebrated poet of Portugal. In a list of the world's great men the name of Luis de Camoëns would stand a long way from the top. For two reasons, however, his name is remembered, and his life's story is interesting. First, he is the "chief and only boast of his country." No other Portuguese poet has been celebrated outside of his own land. Moreover, the epic poem of Camoëns is the only great epic since ancient times which has a truly national subject. Camoëns was born, it is supposed, at Lisbon. His parents were of gentle birth and high social standing, but of little wealth. The family seems to have removed to Coimbra when Luis was about two years of age to escape a pestilence raging in Lisbon. Of Camoëns' early life little is known, except what may be inferred from his writings, where we learn that he wandered on the banks of the Mondego "careless and unfettered in the free license of boyhood." His education was received at the University of Coimbra, where he showed signs of poetic talent and where, it is believed, he first conceived the idea of writing a national epic.

On returning to Lisbon he was received at the court of John III, then king of Portugal. Here began the misfortunes of Camoëns' sorrowful career, due doubtless in the first instance to jealousy. The young man was honest and fearless in expressing his opinions. He was witty, cultured, possessed of poetic genius, and of some personal comeliness. He was, moreover, a favorite with the ladies of the court. He fell in love with Dona Caterina de Alāíde, a lady in waiting of the queen. Another suitor of the lady, fired with jealousy, persuaded her father to join with him, and together they procured Camoëns' banishment from court in 1547. Three years later he joined the army of Africa. He proved himself a brave soldier, but in a naval engagement before Ceuta, he lost the sight of his right eye. Then he fell into careless and dissolute ways. In 1553 he was imprisoned for wounding an equerry of the king in a street fracas. Finally he was pardoned on condition that he would at once embark for India. Fortune served him no better in the East. He wrote a bitter satire on the government and on the life of the Portuguese in India, which increased the malice felt against him. He was banished from Goa, India, to the island of Macao. Here, in a sort of rocky gallery overlooking the sea, Camoëns wrote his great epic poem. The place is called the Grotto of Camoëns. After five years he was allowed to return to Goa. On the voyage thither the vessel was wrecked. The poet saved his life by swimming, and his poem by holding the manuscript out of the water with one hand while he swam with the other. In Goa he was thrown into prison again, on unjust charges. At length, after an absence of seventeen years filled with adventure and suffering, Camoëns returned to his native country and to Lisbon. He found sad changes. His father was dead; his mother "very old and very poor"; the city's population terribly reduced by pestilence, and a young king on the throne.

At last his epic, the *Lusiad,* "dreamed of at Coimbra, commenced in banishment, continued at Ceuta, resumed at Goa and Macao, and perfected in a humble little room at Lisbon, was issued from the press

in 1572." Its success was immense, but in equal proportion was the jealousy and malice it aroused in other poets. The young king granted the author a pension of about twenty-five dollars, but he took with him on his expedition to Africa another poet than Camoëns to sing his triumphs. The expedition was utterly disastrous, the king was slain, and Portugal's independence was lost. Camoëns, who had borne his own troubles with fortitude, was overwhelmed by the troubles of his country. Henceforth he "went as one dreaming," and in 1579 was taken ill of fever and died in a hospital. He was buried in the Church of Santa Ana, which was later destroyed by an earthquake. Of the inscription on a marble slab erected to his memory in the church wall, the only words remembered are, "He lived poor and neglected, and so died."

Beside his epic, Camoëns was the author of many sonnets, ballads, elegiacs, and comedies. In most of them there is a strain of grief—a tragic note—born of the sufferings of a gifted man whose gifts were his own destruction. The great epic, *Os Lusiadas,* or *The Lusiad* (meaning The Portuguese), is in ten cantos. It has been translated into nearly every European language. A little over a century after its first appearance thirty-eight editions had been issued. *The Lusiad* is strictly a national epic. The idea that Vasco da Gama is its hero is unquestionably a mistake. The nation is its hero; love of country its inspiration. The framework is slight. The poet selects the most brilliant episode in Portuguese history—the discovery of the passage to India. With wonderful skill he weaves into his narrative of the discovery every memorable expedition, every splendid achievement, every heroic deed, which the history or tradition of Portugal can furnish. According to the custom of the day, he supplies a fabulous element by introducing the Olympian gods. Venus favors the Portuguese; Bacchus (Portugal was notable for its moderate use of wine) opposes them. Vasco da Gama, of course, leads the expedition, but his exploits, like all else, are praiseworthy only in that they add to his country's glory.

The Lusiad is one of the noblest monuments ever raised to the national glory of any people. —Botta.

Camomile, kăm-o-mīl, or **Chamomile,** a plant closely allied to the yarrow and ox-eye daisy. An exceedingly bitter medicine is obtained by drying the daisy-like flowers and steeping them in twenty times their weight of water. Camomile is an old-fashioned emetic and a remedy for fever. It is cultivated as a field crop in parts of England. A showy relative of the medicinal camomile, the golden marguerite, is used by florists as a border plant. May weed, an ill-scented occupant of roadsides, is a humbler and less acceptable relative. See MEDICINE.

Camorra, an Italian secret society, after the order of the Mafia. It existed in the former kingdom of Naples, and at times spread terror among the inhabitants of northern Italy and Sicily. The Camorriste, as its members are called, were accustomed to appear in public on holidays and festive occasions and extort money from the citizens, who dared not refuse them. They passed contraband goods unpunished, committed numberless murders, and could be hired for any crime, yet were so closely and secretly banded together that the law seemed powerless. Even members of the society who were arrested and imprisoned practiced extortion upon jailers and fellow prisoners, so great was the fear inspired by the organization.

Under Francis II an effort was made to put down the society and many Camorriste were transported. Those who remained formed an alliance with the Garibaldi committee and helped to expel the Bourbons. Under the new government the Camorra became a sort of political machine, at times controlling the municipal government of Naples, including among its members almost the entire body of city employes. In 1879 the Italian government interfered and an investigation was instituted. As a result of this investigation the Honest Government League was formed and the Camorriste who were candidates in the municipal elections of 1901 were defeated.

In still more recent years apprehension

has been felt in the United States and in Sicily on account of the increasing number of violent crimes, committed, it is believed, by members of the Mafia and the Camorra. From January to May, 1909, there were recorded in New York City, 424 "Black Hand" cases and 44 bomb explosions. The word Black Hand, the name of a Spanish secret society, has come to be used to designate a crime of violence committed or supposed to be committed through the medium of a criminal organization. It was estimated at that time that there were 30,000 members of the Camorra in the United States. Some investigators of the subject, however, regard the whole matter as a sort of bugaboo. They claim that the Camorra exists nowhere except in the city of Naples, that the seeming organization in this country is but a banding together at various times and places of two or three criminals or evilly disposed persons. In support of this theory it is shown that the majority of the Italians in this country are law abiding and industrious, that there are practically no Italian tramps and no Italian drunkards, and that very few are in the various penal institutions of the country on serious charges.

Camouflage, Fr. kam-oo-flazh′, protective coloration, designed, in warfare, to deceive an enemy as to the size, number, or nature of objects thus disguised. The term, which came into American usage during the World War, is a French word long used by scene-painters and others to describe disguise by the use of color, or "make-up." The idea is a very old one and was used by American Indians when they donned their war-paint, and in various ways in human warfare for many centuries prior to the war of 1914-18. But it was during the latter conflict that camouflage reached its greatest development, in the disguise of battleships, buildings, vehicles and artillery. Many French, British, Belgian, Italian and American artists were engaged in the work of camouflaging buildings, ships, war material and supplies that came within the range of enemy fire or were likely to be exposed to it; and remarkable results were obtained in many cases. Many ships were thus disguised so as completely to conceal their true character and size; while the whereabouts of great guns were concealed from the prying eyes of enemy airmen by the same means.

Protective coloration, or camouflage, exists in nature to a marked degree. Certain birds, fishes, insects, reptiles, and mammals are protected by their colors from observation by their enemies. Thus, forest animals are frequently green; desert animals are tawny or sandy; and Arctic animals and birds are white, or change their summer coats of dull colors to white in winter. The conspicuous bars, stripes, and spots used in the camouflage of human warfare have their counterpart in nature; for example, the stripes of the zebra are said to afford that animal protection against its enemies, both two and four legged, through their resemblance to streaks of sunlight passing through foliage. There are those who dispute the view that the color markings of any of the lower creatures are designed as camouflage for their protection; but the fact remains that many, if not most, of them have colors that are singularly adapted to render them inconspicuous in their native haunts. Even the giraffe is far from conspicuous when at home in its native jungle; and the camouflage artists of the Great War derived many of their color schemes from nature.

Campania, a region of ancient Italy. It lay on the coast of the Mediterranean between Latium and Lucania. It included Mount Vesuvius. Capua, Pompeii, and Herculaneum were Campanian cities. Modern Naples is the port and metropolis of the region. Campania was noted for agriculture and flocks. The Italians apply the name with slight modification to any plain about a city, as the Campagna of Rome, a fertile plain corresponding to ancient Latium in extent.

Campanile, kȧm-pȧ-nē′la, the bell tower of Italian cities. It is usually a separate structure. The celebrated leaning tower of Pisa is a campanile. It is eight stories high, each surrounded by a row of columns. It leans thirteen feet out

of the perpendicular. Other campaniles are those of Bologna, Padua, Cremona, Ravenna, and Florence. A fine Moorish bell tower erected at Seville, Spain, in 1568, is 350 feet high. It is surmounted by a bronze vane that weighs a ton and a half, yet turns easily in the wind. The campanile of St. Mark's, Venice, was 325 feet high. The figure of an angel sixteen feet tall stood on its summit. It served as a watch tower whence the lookout sighted incoming ships. It was ascended by a winding inclined plane instead of steps. Galileo made many of his observations from this tower. At one time a wooden cage hung half way up, in which prisoners were allowed to starve to death. In 1902 the tower fell with a crash. Antiquarians had a rich find in the brick, some of which was declared to have been brought from Rome as early as the first century.

In storied Venice, down whose rippling streets
The stars go hurrying, and the white moon beats,
  Stood the great Bell Tower, fronting seas and skies—
  Fronting the ages, drawing all men's eyes;
Rooted like Teneriffe, aloft and proud,
Taunting the lightning, tearing the flying cloud.
It marked the hour for Venice; all men said
Time cannot reach to bow that lofty head;
  Time that shall touch all else with ruin, must
  Forbear to make this shaft confess its dust,
Yet all the while, in secret, without sound,
The fat worms gnawed the timbers underground.
The twisting worm, whose epoch is an hour,
Caverned its way into the mighty tower;
  And suddenly it shook, it swayed, it broke,
  And fell in darkening thunder at one stroke.
The strong shaft, with an angel on the crown,
Fell running; a thousand years went down!
—Edwin Markham.

Campanini, Cleofonte (1860-1921), an orchestra leader, identified with many successful musical ventures. He was born at Parma, Italy, and began his musical career as a violinist. While conducting the orchestra of an Italian opera house he was offered a position with the Metropolitan Opera House, New York. From 1903 to 1906 he conducted orchestras at Rome, Milan, Naples and Venice. While at Milan he produced the first version of Puccini's *Madame Butterfly,* which was not a great success. When given in London and American cities, however, this opera was favorably received under his leadership.

He later became conductor of the Manhattan opera house, and during this period he introduced *Louise, Samson and Delilah, Thais* and *The Damnation of Faust.* He was manager and director of the Chicago Grand Opera Company for a number of years.

Campanula. See BELLFLOWER.

Campbell-Bannerman, Sir Henry (1836-1908), a British statesman, was born at Stracathro, Forfarshire, Scotland. He was the son of Sir James Campbell and assumed the surname Bannerman under the will of a maternal uncle. Sir Henry was educated at Glasgow and Cambridge universities. In 1868 he was elected to Parliament for Stirling. In 1871-74, and in 1880-82, he was Financial Secretary to the War Office, and in 1882-84, Secretary to the Admiralty. In 1884-85, Sir Henry was Chief Secretary for Ireland, and in 1886 and 1892-95, Secretary for War. In 1899, he became leader of the Liberal Party, and in 1905 succeeded Sir Arthur Balfour as Premier. The Premier's cabinet comprised men of unusual talent, and contained for the first time in parliamentary history a representative of labor, Mr. John Burns. Sir Henry displayed patience and courage combined with a large fund of common sense, and proved himself an able Minister. Because of ill health, he resigned in 1908.

Campbell System, The. See DRY FARMING.

Campbell, Thomas (1777-1844), a British poet and miscellaneous writer. He was born at Glasgow and was educated at Glasgow University. While a student he distinguished himself for translations of Greek poetry into English verse. At the age of twenty-two he published *The Pleasures of Hope.* This poem was "written in a garret, rewritten, rearranged, and polished to perfection." It was an instantaneous success. Its author was at once offered employment by booksellers. That he was not at once successful financially seems to have been due to his own procrastination and, possibly, his own indolence. In 1805 the British government

settled a pension of £200 or $1,000 a year on him. Campbell continued to write poetry and prose. He delivered lectures on poetry. He was for ten years editor of the *New Monthly Magazine*. He died in France, and his body was interred in Westminster Abbey.

Gertrude of Wyoming was published in 1809. As a poem it was thought by certain critics to excel *Pleasures of Hope*. The scene is laid in Pennsylvania, and the poem relates a tragic story of the Revolution. The descriptions of sylvan scenes and of domestic happiness are beautiful. It is lacking in dramatic qualities and is, on the whole, too sentimental. Campbell's lyrics and the ballad, *Lord Ullin's Daughter,* are the best known of his poems.

The names and range of his principal poems are sufficiently indicated by the following quotations:

'T is distance lends enchantment to the view,
And robes the mountain in its azure hue.
—*Pleasures of Hope.*

'T is the sunset of life gives me mystical lore,
And coming events cast their shadows before.
—*Lochiel's Warning.*

And rustic life and poverty grow beautiful beneath his touch.
—*Ode to the Memory of Burns.*

Ye mariners of England,
That guard our native seas,
Whose flag has braved a thousand years
The battle and the breeze.
—*Ye Mariners of England.*

The combat deepens. On, ye brave,
Who rush to glory or the grave.
Few, few, shall part where many meet,
The snows shall be their winding sheet,
And every turf beneath their feet
Shall be a soldier's sepulchre.
—*Hohenlinden.*

Camp-Fire Girls, a national organization of girls from 12 to 20 years of age, with local groups known as Camp Fires. It was formed in 1911 by Dr. Luther H. Gulic and his wife. Its purposes as set forth in *The Book of The Camp Fire Girls* are:

To show that the common things of daily life are the chief means of beauty, romance and adventure, to aid in the forming of habits, making for health and vigor, the out-of-door habit and the out-of-door spirit; to devise ways of measuring and creating standards of women's works; to give girls the opportunity to learn 'how to keep step', to learn team work, through doing it; to help the girls and women to serve the community, the larger home, in the same ways they have always served the individual homes; to give status and social recognition to the knowledge of the mother and thus restore the intimate relationship of mothers and daughters to each other.

Fire, which stands for home, service and romance, is the symbol of the organization; its watchwords are Work, Health, Love.

Each camp fire is in charge of a Guardian who is appointed by the National Association.

There are three degrees in the membership—Wood Gatherer, Fire Maker and Torch Bearer. Any girl may join the organization by making application and signifying a willingness to comply with the law of the Camp-fire:

Seek beauty.
Give service.
Pursue knowledge.
Be trustworthy.
Hold on to health.
Glorify work.
Be happy.

To become a Fire Maker, the Wood Gatherer must be able to chant the

FIRE MAKER'S SONG.

As fuel is brought to the fire,
So I purpose to bring
My strength,
My ambition,
My heart's desire,
My joy
And my sorrow
To the fire
Of humankind.
For I will tend
As my fathers have tended,
And my father's fathers
Since time began,
The fire that is called
The love of man for man,
The love of man for God.

Ability to carry out the following lines of activity is also essential.

To help prepare and serve, together with the other candidates, at least two meals for meetings of the Camp-fire.

To mend a pair of stockings, a knitted undergarment and hem an article having a hem one yard in length.

To keep a written classified account of all money received and spent for at least one month.

To tie a square knot five times in succession correctly and without hesitation.

To sleep with open window or out-of-doors for at least one month.

To take an average of at least half an hour daily outdoor exercise for not less than a month.

To refrain from soda water, chewing gum and candy between meals for at least one month.

To name the chief causes of infant mortality in summer, and tell how and to what extent it has been reduced in American communities.

To know what to do in the following emergencies: clothing on fire; person in deep water who can not swim; open cut; frosted foot; fainting.

To know the principles of elementary bandaging and how to use surgeon's plaster.

To know what a girl of her age needs to know about herself.

To commit to memory any good poem or song not less than twenty-five lines in length. To know the words of America.

To know the career of some woman who has done much for her country or state.

To become a Torch Bearer, the Fire Maker must be known to the Guardian to be a successful leader of girls, and win 15 elective honors in addition to those required to become a Fire Maker. The Torch Bearer is the guardian's assistant.

Each Camp Fire holds a council once a month, and it should hold a meeting every week. The degrees of membership are indicated by rings, pins and other insignia, and the rites and ceremonies of the organization are similar to those originally used by the American Indians. A Camp Fire may be organized by selecting some woman who is willing to act as Guardian. She sends to the National Association in New York for a license as guardian and when this is received she can form the organization. See Boy Scouts of America.

Camphor, kăm′fer, a whitish, semi-transparent, oily substance, obtained from the wood of the camphor tree. It has a peculiar, penetrating odor, and a tough, crystalline structure. The world's supply is obtained chiefly from Japan and Formosa. Chips obtained from the root, trunk, and branches of the laurel or camphor tree are heated in closed retorts and exposed to the action of hot steam. The camphor is tried out in the form of a vapor and crystallizes on the upper part of the retort. It is sent to market usually in a crude state, and refined elsewhere. Camphor is known in science as a solid, essential oil. It floats on water. It may be dissolved in alcohol, but not readily in water. It burns with a white smoky flame. It is used in medicine, especially in cases of gout and rheumatism. It is a valuable ingredient, also, in certain liniments. The odor of camphor is obnoxious to insects. Camphor balls are stored with furs and woolens to prevent the attacks of moths. They are useful in a cabinet of insects or bird skins. Camphor wood is used also to construct insect-proof chests in which to store clothing. Formosa produces 6,000,000 pounds of camphor a year. Large groves have been discovered recently. The production is a government monopoly. The United States imports 2,000,000 pounds yearly, chiefly from Formosa and the East Indies. The world requires about 8,000,000 pounds yearly.

Campus Martius, a famous level place in ancient Rome. It lay between the more northerly of the seven hills and the Tiber. It stretched along the river for a mile or so. It must have been at least half a mile in width. The name signifies "Plain of Mars"—military plain, we might translate it. It was used for military exercises and for popular assemblies. During the reign of Augustus public buildings, booths, circuses, theaters, and temples began to encroach upon the campus; but there was still room for chariot races, horse races, ball games, and other athletic sports. It is now occupied by the chief part of modern Rome. See Rome.

Canaan, kā′nan. See Palestine.

Canada, Dominion of, the most important outlying possession of the British Empire, occupies all of North America north of the United States, with the exception of Newfoundland and Alaska. Its greatest extent from east to west is 2,700 miles, and from north to south 1,600 miles. The area is 3,729,665 square miles, including 125,755 square miles of water surface, exclusive of Hudson Bay (400,000 square miles), and the Gulf of St. Lawrence (170,000 square miles). Politically, the Dominion is divided into the following provinces and territories:

Province	Square Miles
Alberta	255,285
British Columbia	355,855
Manitoba	251,832
New Brunswick	27,985
Nova Scotia	21,428
Ontario	407,262
Prince Edward Island	2,184
Quebec	706,834
Saskatchewan	251,700
Northwest Territories	1,242,224
Yukon	207,076

Newfoundland, although it includes Labrador, a part of the Quebec peninsula, is not now and never has been politically a part of the Dominion of Canada.

THE PEOPLE. The population of Canada in 1921, as shown by the decennial census, was 8,778,483. This is an increase of more than double in the past fifty years. The growth of population in this period is shown by the following figures:

		Percentage of Increase in Decade
1871	3,485,761	.....
1881	4,324,810	17.23
1891	4,833,239	11.76
1901	5,371,315	11.19
1911	7,206,643	34.13
1921	8,778,483	21.72

English is the native tongue of more than one-half the inhabitants, and French of about 2,000,000. Of the English-speaking populace the majority are of English, Scotch or Irish descent. In the twenty years preceding the World War over 1,000,000 immigrants crossed the border from the United States. The French-speaking people are descendants of the early French colonists, who were the only white settlers in the country when Canada became an English possession in 1763. Most of the French are in Quebec, where they have perpetuated not merely the language but the laws and customs of their forefathers so carefully that the traveler might easily believe himself in France.

Prior to 1897 annual statistics of immigration were not kept accurately, and it is possible to make only approximate estimates. During these first thirty years of the Dominion's existence the immigration varied from about 12,000 in 1868 to 130,000 in 1883. The increased immigration in the latter year and in subsequent years was due to the opening of the Canadian Pacific Railway and the settlement of the Northwest. In the nineties immigration reached its lowest annual figure in 1896, with only 16,000 immigrants, but beginning in 1902, and much more marked in 1903, the stream rose to new high levels as a result of renewed activity in railway construction, and of the policy of advertising the agricultural possibilities of western Canada. The maximum was reached in 1913, with a total of 492,432 immigrants, of whom 150,000 came from the United Kingdom and 139,000 from the United States. During the World War immigration practically stopped except from the United States, but it began again in 1919 and by 1921 had reached the respectable total of 148,000, of whom one-half, almost to a man, came from the British Isles.

Although in Canada, as in the United States, there has been a sharp trend of population from east to west, the eastern provinces are still the most densely populated, and show a larger percentage of urban population than the West.

	Population, 1921	Pop. per Sq. Mi.	Urban % of Total Pop.
Alberta	588,454	2.33	37.88
British Columbia	323,533	1.4	.....
Manitoba	610,118	2.63	42.86
New Brunswick	387,876	13.8	31.50
Nova Scotia	523,837	24.4	43.02
Ontario	2,933,662	8.02	58.19
Prince Edward Is.	88,615	40.56	21.5
Quebec	2,361,199	3.42	56.03
Saskatchewan	757,510	3.14	28.90

The twelve largest cities of Canada with their population at the last census are:

Montreal	618,506
Toronto	521,893
Winnipeg	179,087
Vancouver	117,217
Hamilton	114,151
Ottowa	107,843
Quebec	95,195
Calgary	63,305
London	60,959
Edmonton	58,821
Halifax	58,372
St. John	47,166

RELIGIONS. Although Canada has no state church, in Quebec the Roman Catholic Church still possesses some privileges which it has held since the days of French rule. For many years the Roman Catholic Church was the only organized religious body in Canada, and it still has the

VIEWS IN CANADIAN CITIES.

PARLIAMENT BUILDING, OTTAWA

The government buildings are the crowning architectural feature of Ottawa. The most imposing structure in the group is the Parliament Building, one of the finest structures in America.

DUFFERIN TERRACE, QUEBEC

Dufferin Terrace is a promenade 1400 feet long overlooking the St. Lawrence. To the right is seen a section of the lower town.

One of the sources of wealth to the farmer.

The wheat fields of Canada, when fully developed, can feed the world.

This shows the sort of homes the farmers are able to build.

largest number of adherents, comprising nearly 40 per cent of the total population. The Presbyterians, Methodists and Anglicans (Church of England) are next in order of numbers. Baptists and Lutherans, Greek Orthodox, Jews and Mennonites and other sects aggregate less than a million people.

SURFACE AND DRAINAGE. Canada is divided physically into three great sections: (1) eastern Canada, including the Laurentian highlands; (2) the interior plains; (3) the Cordillera, or mountains of the West.

Eastern Canada includes all the land between the Atlantic Ocean and Hudson Bay. The highest elevations in this section occur in the interior of Labrador, where some peaks reach an altitude of 8,000 feet (see LABRADOR PLATEAU). From these elevations westward the altitude drops rapidly, so that the interior of northern Quebec seldom exceeds 2,000 feet. The interior is a succession of low rocky ridges, between which are lakes, swamps and rapid rivers. Dividing the Hudson Bay drainage from the St. Lawrence basin is a ridge, hardly noticeable, called the "height of land." South of the height of land all the rivers are tributary to the St. Lawrence, which was the most important physical influence in the early history of Canada. Without it, the settlement of Canada would probably have been restricted to the coast, as was the case in the English colonies to the south. Eastern Canada also includes the Acadian region, comprising the Gaspé peninsula in Quebec and the provinces of New Brunswick, Nova Scotia and Prince Edward Island. This region, geologically, is a continuation of the Appalachian highlands of the United States. Unlike the St. Lawrence valley, which has almost no mineral deposits, this region is rich in coal, copper, asbestos and other metals.

The great central or interior plains are about 700 miles wide from east to west at the international boundary, narrowing to 400 miles at the Arctic Ocean. In a general way, their surface is like that of the interior plains of the United States, but the Canadian plains are more broken and have more timber. The southern part of the plains, however, except in the river bottoms is almost treeless. To the west, where the plains rise in two well-defined escarpments to an altitude of nearly 4,000 feet, there are numerous lakes, but near the United States boundary the climate is so dry that many of the lakes are strongly alkaline, and some of them dry up in summer. The line dividing the Hudson Bay drainage from the Mississippi River basin coincides roughly with the international boundary. Farther north, beyond the Saskatchewan River, is another watershed which divides the Hudson Bay systems from the streams flowing to the Arctic Ocean. The northern river system includes the Athabaska and the Peace rivers, together with the numerous smaller streams which combine to make the Mackenzie the greatest river system in Canada. The Saswatchewan and the Red rivers, although smaller, have been economically more important; they were formerly the main avenue of travel, and their valleys are today the centers of population in the Central West.

The western mountains are the third of the great physical divisions of Canada. They cover practically the whole of British Columbia, the Yukon and the western strip of Alberta. This entire region is part of the Cordilleran belt which extends along the Pacific coast of both North and South America. While the physical structure of this section is somewhat confused, due to the frequent alternation between mountain ranges and elevated plateaus or sheltered valleys, the dominating features are the Rocky Mountains and the Coast Range. All the important ranges run roughly northwest to southeast in parallel lines; cross ranges are few and smaller.

CLIMATE. The climate of a country so vast in extent and so varied in topography as Canada cannot be briefly summarized. It is described in detail in the article on each province. But taken as a whole, Canada has bracing weather both summer and winter, with abundant sunshine to ripen crops. Except on the eastern slopes of the mountains, and in parts of the interior plains, rain and snow fall are heavy.

Canada has a temperate climate at the south, gradually changing to Arctic in the north, but this general condition is greatly modified by the differences in the longitudinal physical belts which have already been described.

MINERALS. Canada has an abundance of minerals; the average annual output is well over $200,000,000 a year. Of this amount coal represents more than one-third. The coal measures exceed 11,000 square miles in area and are second in importance in the British Empire. The bituminous mines of Nova Scotia are among the richest in the world; British Columbia and Alberta have large areas of bituminous coal and some anthracite, while even the prairie provinces have large sections underlaid with lignite or brown coal which will undoubtedly be commercially important before many years. Petroleum is produced in paying quantity in several provinces, as is also natural gas.

Of the metals copper is by far the most valuable. It occurs in various sections, and usually in large bodies. In various years the first place in metals has been held either by gold or silver. The placer mines of British Columbia had already declined almost to the vanishing point when the Yukon in 1897 suddenly became a great producer. Then in 1911 came the opening of the Porcupine field which made Ontario the largest producer of this metal. Ontario also leads in the production of silver, 90 per cent of the output coming from the Cobalt district, opened in 1904 and 1905. In nearly every place where silver is found it occurs in combination with lead, but most of the lead sent to smelters is mined in British Columbia.

Canada is the world's greatest producer of two minerals—nickel and asbestos. Nickel comes almost exclusively from the Sudbury district and in recent years has been the most valuable of Canada's metals in Ontario; asbestos comes largely from eastern Quebec, Thetford being the center of the industry.

AGRICULTURE. Taken as a whole, the northern half of Canada is too cold for successful farming, but the southern half is a rich agricultural region. Agriculture is the leading industry, both in value of products and in invested capital, and half of the entire population are engaged in it. The eastern provinces are adapted to general farming, dairying and fruit-growing. Manitoba, Alberta and Saskatchewan form one of the greatest grain-growing regions of the world, and the valleys of British Columbia are suited to fruit and to mixed farming. In the older sections, and even on the more recently settled prairies, there is a growing tendency toward diversified farming. No branch of agriculture has had a more rapid growth than dairying and its allied industry, poultry raising. Quebec produces about two-thirds of the butter, while Ontario has about one-half of the poultry. The development of farming, particularly in the West, has been stimulated by irrigation. The best-known irrigation projects are those of the Canadian Pacific in the region between Calgary and Medicine Hat, and those in the Okanagan, Thompson and Columbia valleys in British Columbia.

FORESTS AND LUMBER. The forest area of Canada is estimated at 781,000 square miles. This is the largest forest area possessed by any lumber-producing country in the world and over one-half of it is covered with merchantable timber. The area is naturally divided into three divisions:

1. The southeastern, which includes the Maritime Provinces, the Saint Lawrence valley and most of the southern part of Ontario. The trees in this division are pine, spruce, cedar, maple, ash, beech and birch.

2. The northern division, which extends across the continent to the Rocky Mountains. The southeastern part is heavily wooded—spruce, pine, tamarack and poplar being the trees found in greatest numbers. The northern part is less densely wooded and the trees consist of those hardy varieties adapted to cold climates—the larch, the spruce and the canoe-birch.

3. The western division, extending from the Rocky Mountains to the coast. This region is densely forested with Douglas fir, black pine, white spruce and cedar.

Lumbering is an important industry in each of the provinces except Prince Ed-

ward Island. The capital invested in it is estimated at $250,000,000, and the annual value of products is about $225,000,000, of which sawn lumber represents one-half. These figures do not include the Canadian pulp and paper industry, which has an invested capital of nearly $300,000,000 and an annual output of $100,000,000 paper and $50,000,000 pulp.

Fisheries. Canada has the most extensive fishing grounds and the largest number of food fish of any country in the world. There are 5,000 miles of coast along the Atlantic and 7,000 miles along the Pacific, all of which are excellent fishing grounds. Moreover, the Grand Banks, the most valuable of deep-sea fishing grounds, lie from 20 to 90 miles off shore. The inland waters are abundantly stocked with whitefish, lake trout, sturgeon, bass, pike and pickerel.

Cod, haddock, hake and halibut are taken in large quantities by the deep-sea fishermen, and the inshore waters yield haddock, hake, herring, mackerel, shad, flounders and sardines. Lobsters are taken in large numbers and there are valuable oyster beds in the Gulf of Saint Lawrence.

Salmon exceed all other fish on the Pacific coast in number and value, and they are taken in such quantities as to make British Columbia the leading province in the fishing industry. The average yearly output of the Dominion fisheries is about $50,000,000.

Manufactures. Canada possesses raw materials and water power necessary for the development of extensive manufactures. Yet for many years other industries, perhaps requiring less capital and yielding satisfactory returns, absorbed the public interest to a large degree. During the decade from 1910 to 1920, however, there was a remarkable increase, due partly to war activities and to higher prices, but representing nevertheless a real and tremendous growth. The capital invested in manufactures nearly trebled—from $1,200,000,000 in 1910 to more than $3,000,000,000 in 1920—and the value of products manufactured jumped in the same ratio—from $1,165,000,000 to $3,500,000,000. In the order of value, the chief industries were flour and grist mills, meat packing, steel and iron products (during the war these were first); lumber, lath, and shingles, pulp and paper, butter and cheese. Ontario, Quebec, Nova Scotia and New Brunswick in order, are the leading provinces in manufacturing.

Transportation and Communication. In Canada, as in the United States, the railroads have been pioneers; they have blazed the way for settlers and industry to follow. In proportion to its population Canada has a greater railway mileage than any other country in the world, approximately 40,000 miles. Of this total nearly one-half is included in the Canadian Pacific Railway, while the remainder comprises the Grand Trunk, Grand Trunk Pacific, Canadian Northern, and Intercolonial railways, all grouped and operated under the name of the Canadian National Railways. As a result of post-war conditions, between 1918 and 1921 all the railway mileage of the country, except the Canadian Pacific Railway, was brought under a unified government control. High operating costs and business depression combined to make it impossible for the roads, under private management, to pay operating expenses and interest charges. About one-third of the common stock of the Canadian Northern had been acquired by the government in 1913 and 1914 in consideration of certain government subsidies and guarantees of interest on bonds. The balance was acquired in 1917 at a price fixed by arbitration. The financial control of the Grand Trunk was taken over by the government in 1921 following prolonged negotiations and arbitration.

Canada really has three transcontinental lines, two of them under government control: The Canadian Pacific, the Canadian Northern, and the consolidated Intercolonial—Grand Trunk Pacific system, operated for a number of years under the name of the Canadian Government Railways. All the railways represented a capital investment of about $2,000,000,000, or roughly $51,000 per mile as compared with $58,000 for the United States and $272,000 for Great Britain.

Electric lines are numerous in the more

densely populated sections, and every city and important town has a street railway system. The total mileage for the Dominion is about 1,800, representing an investment of about $175,000,000.

The chief waterway includes the Saint Lawrence and its lakes, tributaries and canals, which furnish an unbroken route from the head of Lake Superior to the Atlantic. The Welland Canal is being enlarged and the canals around the rapids in the Saint Lawrence will eventually be deepened so that ocean-going ships can pass to Europe. Montreal, at the head of navigation on the Saint Lawrence during the summer, and Quebec, are important ports. Saint John, N. B., and Halifax, N. S., have excellent harbors open throughout the year, and lines of steamers controlled by the great railways ply between these ports and Europe. On the Pacific Coast, Prince Rupert and Victoria have excellent harbors and lines of steamers ply regularly between these ports and those of China, Japan and Australia.

The Dominion maintains an excellent mail service that reaches the remotest settlements. Its telegraph and telephone lines are ample for the needs of the people. The Canadian Air Board, under a minister of the Crown, gives attention to the developments of airplanes and seaplanes.

Government. The Dominion of Canada is a union of Federal States (called provinces) in which each province has the authority to legislate upon its own affairs, and the Federal or Dominion government holds the power to legislate on all matters affecting the welfare of the country as a whole. In Canada, the powers not specifically delegated to the Provinces are reserved to the Dominion government; in the United States, the powers not specifically delegated to the Federal government are reserved to the States. The government is based on the British North America Act of 1867, and has three departments —executive, legislative and judiciary.

Executive Department. Although Canada is a democracy, it is a dependency of Great Britain; the British sovereign is nominally at the head of the government, and the Governor-General who is appointed by the King, acts as his representative. He receives $50,000 a year and his term is usually for five years. Technically he appoints all ministers, though they are selected by the Premier, and he must approve all laws passed by Parliament. He is assisted by a cabinet or council of ministers responsible to Parliament consisting of the heads of the departments of government and varying in number from 17 to 20.

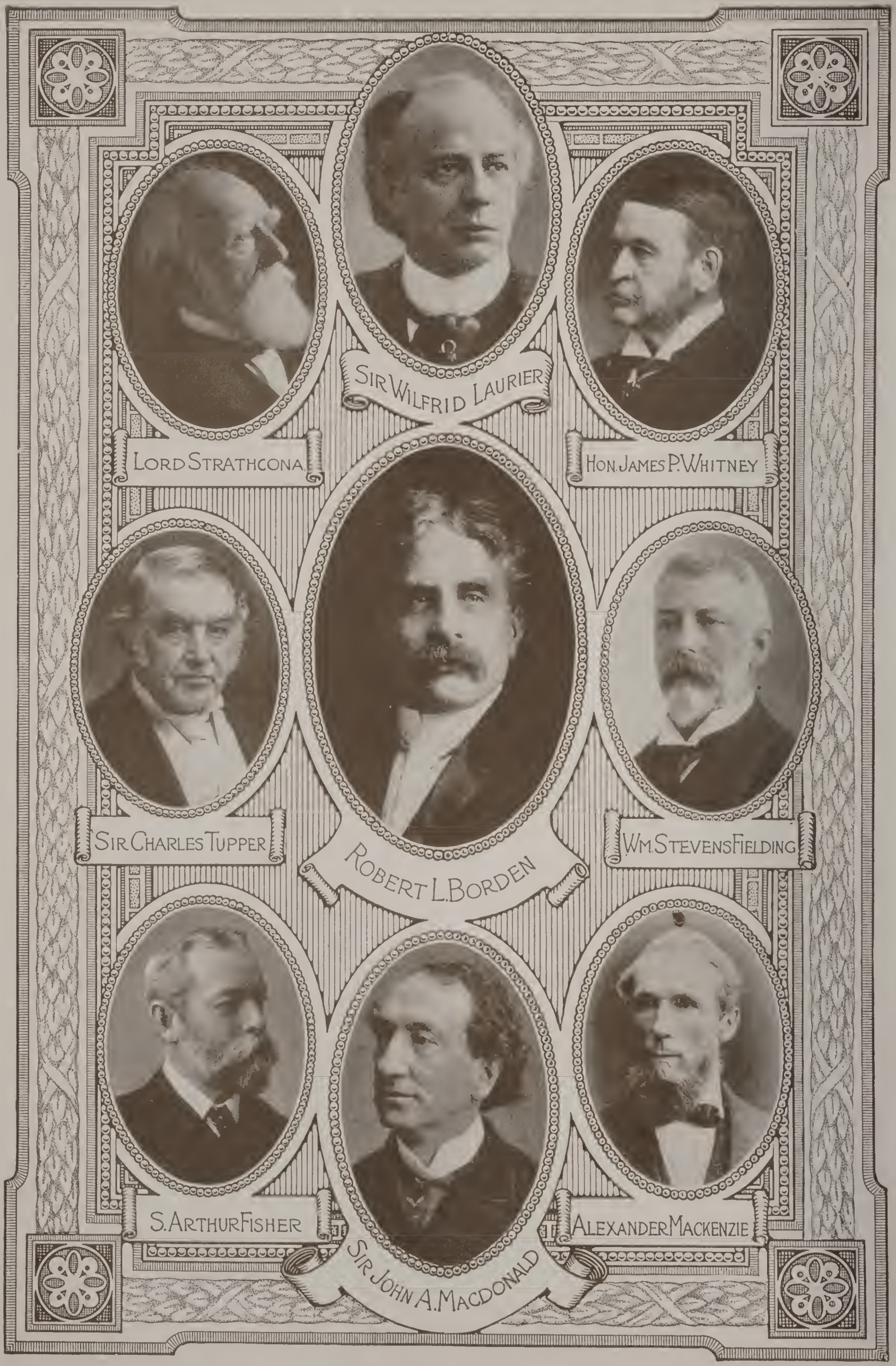
The Prime Minister or Premier is at the head of the council and presides over its sessions. All members of the council must be members of Parliament. The Premier is the actual head of the government, since the Governor-General never passes upon measures without the Premier's consent.

Legislative Department. The legislative department is vested in a Parliament consisting of a Senate and a House of Commons. The members of the Senate are appointed by the Governor-General for life. Unlike the United States Senate, the number of senators for each province varies with population. A senator must be at least 30 years of age, a born or naturalized citizen of Canada and own at least $4,000 of real or personal property in the province from which he is appointed. Members of the House of Commons are apportioned among the provinces according to the population, and are elected by popular vote based on universal suffrage. No property qualifications are necessary; the candidate must be a British subject.

Both houses have the same powers except that financial measures must originate in the House of Commons. A bill must pass three readings in each house and be signed by the Governor-General to become a law.

Judicial Department. There are three Dominion courts—the Supreme Court, the Exchequer Court and the Admiralty Court. The jurisdiction of these courts extends to cases affecting the "Crown" which is the same as the Dominion. The Judges of all provincial courts are paid by the Dominion, but their procedure and jurisdiction are determined by the provinces. Each province has its own civil code; but only one criminal code exists for the Dominion.

CANADIAN WRITERS



CANADIAN STATESMEN

Local Government. The government of each province is patterned after the Dominion government. A lieutenant-governor appointed by the Governor-General in Council is the chief executive officer. The heads of departments constitute the executive council. With the exception of Quebec and Nova Scotia, the provincial legislatures consist of but one house, generally styled the Assembly. Its powers do not extend beyond measures affecting its own province.

History. In 1497, John Cabot discovered the coast of North America off Labrador and planted the standard of Great Britain on Newfoundland. It was upon this incident that Great Britain based her claim to North America. In 1535 Jacques Cartier discovered the Gulf of Saint Lawrence and the river, up which he sailed as far as the site of Montreal. He spent the winter of 1535 at Quebec, but made no permanent settlement. The first English settlement was made at Saint Johns in 1583 by Sir Humphrey Gilbert, but it was soon abandoned. Quebec, founded by Samuel Champlain in 1608, was the first permanent settlement. Until his death in 1635 Champlain devoted his energies to the success of the colony. Quebec soon became the center of the fur trade which was the foundation of prosperity in New France, as the colony was called. Champlain made trips to the interior and formed an alliance with the Huron and Algonquin Indians. He aided them in a war against the Iroquois and thereby turned the Iroquois against the French, until Canada passed under British control. Montreal was founded in 1643.

Franciscan and Jesuit missionaries followed Champlain and established missions among the Indians far in the interior. For a time the Jesuits exerted a strong influence over the civil affairs of the colony, often quarreling with the governors. Between these quarrels and the attacks by the Iroquois the colony led a precarious existence during its first half century.

In 1672, Frontenac was appointed governor and for ten years he ruled Canada with a firm hand. He regulated the fur trade, checked the Iroquois and established military posts at Frontenac, Niagara, Mackinac and at Fort Saint Louis (Starved Rock) Illinois. Joliet and Marquette, and LaSalle explored the Mississippi River and laid claim to its great valley in the name of France. See Cartier, Jacques; Champlain, Samuel; Frontenac; Joliet; Marquette; LaSalle.

Difficulties with the English began in 1629, and continued for more than a century. During this period the French strove to establish themselves firmly in New France, and the English strove to dispossess them. Wars between France and England at home extended to the colonies and are recorded in American History as French and Indian wars. The last culminated in the Battle of Quebec in 1759. In the Treaty of Paris, 1763, the French ceded to Great Britain all their territory in North America except the district and city of New Orleans. The French settlers were allowed to retain their language, religion and laws, and they became loyal British subjects. There were at this time about 60,000 French and 500 English in the colony.

The influx of English settlers began when the thirteen colonies forming the United States of America declared their independence. Many inhabitants of these colonies, unwilling to renounce allegiance to the mother country, emigrated to Canada, settling chiefly in New Brunswick, Nova Scotia and the southern part of Ontario. These immigrants, the United Empire Loyalists, laid the foundations of the English settlements in Canada, and from that time to the present they and their descendants have exercised a powerful influence in the country's affairs.

The Struggle for Responsible Government. Canada was governed from 1774 to 1791 under the terms of the Quebec Act, which was notable for the liberal terms it gave to the French Canadians. As the number of English settlers increased it became clear that this act was no longer satisfactory, and in 1791 the Constitutional Act divided the colony into Upper Canada and Lower Canada. Upper Canada, English-speaking, had a popula-

tion of 20,000; Lower Canada, mostly French-speaking, had six times that number. For fifty years Upper and Lower Canada were separate provinces, each with its own governor, legislative council and assembly. In its structure the government was representative, and in theory the assembly was responsible to the people, but in practice the governor and officials chosen by him were absolute. So bitter did the struggle become that it broke forth into open rebellion in 1837, when the radicals, led by Louis Papineau in Lower Canada and by William Lyon Mackenzie in Upper Canada, took arms against the government. Though the rebellion was doomed to fail, it had one great result, in that it forced the British government to take cognizance of the critical state of affairs in Canada. The Earl of Durham was sent over as governor-general and high commissioner, and as a result of his famous report, issued in 1839, Upper and Lower Canada were reunited by the Act of Union of 1840 which became effective February 10, 1841.

The operation of this act was a disappointment to the reformers. There was always friction between the two sections, even though the ministries included the leaders of the dominant party in both provinces. In each province, moreover, were local issues which further divided the political parties. The result of this unrest was that no ministry had a large majority, and none stayed long in office. In this changing array of ministers the leading figures were Robert Baldwin, Sir Louis Lafontaine, Sir Alan McNab, Sir Etienne Taché, George Brown, John A. Macdonald, Sir Francis Hincks, John Sandfield Macdonald, and Thomas D'Arcy McGee. But in spite of confusion, three important reforms were enacted: (1) in 1849 a system of municipal government was provided for Upper Canada; (2) in 1854 the clergy reserve in Upper Canada were secularized; and (3) in the same year seigniorial tenure was abolished in Lower Canada.

Confederation and Expansion of the Dominion. Confederation had been suggested early in the nineteenth century, and had been urged by the Earl of Durham. But it was not until 1864 that steps looking toward that end were taken. A coalition cabinet under George Brown was formed to work for a federal union, and at a conference of leaders in Quebec a set of resolutions, embodying a plan of government, was adopted. These resolutions were embodied in the British North America Act, which was passed by the British Parliament in 1867 and came into force on July 1 of that year. By this act Canada was divided into the two provinces of Ontario and Quebec, which with New Brunswick and Nova Scotia, were now to form the Dominion of Canada.

One of the first acts of the new Government was to seek annexation of the Northwest, which was still owned by the Hudson's Bay Company. Under pressure from the home government the company surrendered its territorial rights in 1869, but retained its trading posts and privileges and one-twentieth of all the land lying west of Lake Winnipeg and south of the north branch of the Saskatchewan River. The transfer of authority from the company to the Dominion government caused the Red River Rebellion, led by Louis Riel, who had persuaded the metis or half-breeds that the change would mean the loss of their privileges and perhaps of their lands. The rebellion was a failure, and was followed immediately by the creation of the province of Manitoba, July 15, 1870. In 1871 British Columbia joined the Confederation, on condition that a transcontinental railroad be built, and two years later Prince Edward Island joined.

For twenty-five years the organization of the Dominion remained without a change, but the development of the West then led to the creation of two new provinces in 1905—Alberta and Saskatchewan—out of part of the old Northwest Territories. Thus a solid row of provinces reached from ocean to ocean. In 1912 a further change was made by greatly enlarging the provinces of Manitoba, Ontario and Quebec.

National Problems. The union and expansion of the Dominion were brought about only after great difficulties. At the very first general election, in August, 1867,

the ministry formed by Sir John A. Macdonald was overwhelmingly repudiated in Nova Scotia, and for several years Nova Scotia fought to secure repeal of the British North America Act. The postal system was established, a national banking act was passed in 1871, and the first railway system, the Intercolonial, was opened in 1876. For more than a decade the chief political issue was the building of the Canadian Pacific Railway. The Liberals, led by Alexander Mackenzie, proposed that the road should be built piecemeal by the government, and they held office for five years on this platform, but the road was finally built by private capitalists, with, however, some financial aid from the Dominion government. From 1867 to 1891, except for the years 1873-78, the dominant figure in Canadian politics was Sir John A. Macdonald. While he lived he ruled and held his party together, but after his death dissensions among the Conservatives cost them the confidence of the country, and in 1896 the Liberals were returned to power.

The new premier, Sir Wilfrid Laurier, was the first French-Canadian to hold that office. During the fifteen years of his administration Canada experienced a remarkable economic development as well as development of national unity. Examples of this new spirit are the laying of the Pacific cable from Canada to Australia, the celebration of the Quebec Tercentenary in 1908, the removal of British garrisons and the substitution of Canadian troops, making the Dominion responsible for its own defense, and the negotiation of commercial treaties with France, Japan and the United States. The reciprocity treaty with the United States was ratified by Congress, but met such bitter opposition in the Dominion Parliament that the Laurier ministry chose to present the issue to the country at a general election. The result was the fall of the Liberals, and the selection of a Conservative cabinet, headed by Robert Laird Borden.

During the first two years of the Borden ministry the chief issue was naval policy. The government, on the plea of emergency, attempted to secure the appropriation of $35,000,000 for the construction of three battleships, to form a part of the British navy. The Liberals insisted that the principle of a strictly Canadian navy should not be departed from, and succeeded in defeating the plan in the Dominion senate. Another question which caused heated debates was the Borden plan of continued financial aid to the railroads. But all of these issues became insignificant in 1914, with the outbreak of the World War.

Canada in the War. Within three hours after Great Britain had declared war, a call was issued for a special session of the Dominion Parliament. Partisan differences were forgotten, and everywhere throughout the Dominion people gave evidence of their patriotism. Within three weeks 32,000 volunteers were in training at Camp Valcartier, and 150,000 more men had offered themselves. The first Canadian contingent arrived in England on October 16, 1914, and in the next February was in the lines in France. On April 22, in the second battle of Ypres, the Canadian division, though greatly outnumbered, held its ground, and thereby saved the Allies from a terrible disaster. In the second battle of Ypres, or the battle of St. Julien, as the Canadian part of it is called, the Canadians made good. In 1916 the Canadian divisions fought on the Somme, and in April 9, 1917, took Vimy Ridge. They were in the thick of the fighting around Passchendaele late in 1917, and in 1918 were in the second battle of Amiens, at Arras, Cambrai, and Mons. The total number of men enlisted in Canada was 595,441, of whom 465,984 were obtained by voluntary enlistment. The casualties included 51,674 killed in action or died of wounds, 4,960 died of other causes in France, and 149,732 wounded.

For more than four years Canada was thoroughly organized for war. Industry at home was under the control of boards and commissions, all working toward one end. Ships, munitions, donations to war funds, war loans and victory loans, all the mechanism of civilization was at the disposal of the Empire.

One important result of the war was

that Canada, together with the other dominions, acquired a new status within the empire. A status, however, not yet recognized or crystallized in any constitutional law, agreement or machinery. Sir Robert Borden, by virtue of his position of Premier of Canada, was a member of the imperial war cabinet. Members of the Canadian government attended the peace conference, and signed the treaty of Versailles.

Political Changes. During the war the Duke of Connaught, who had been governor general since 1911, was succeeded by the Duke of Devonshire, who served from 1916 to 1921, when he in turn was succeeded by Baron Byng of Vimy. Meanwhile the political situation in the Dominion was

The following are the latest trustworthy Canadian statistics:

Land area, square miles	3,729,665
Water area, square miles	125,755
Forest area, acres	500,000,000
Population (1921)	8,778,483
English	1,823,150
Irish	1,050,384
Scotch	997,880
French	2,054,890
Indians	105,492
Chief cities:	
Montreal	706,600
Toronto	499,278
Winnipeg	200,000
Vancouver	123,050
Quebec	114,550
Hamilton	108,143
Ottawa	107,732
Calgary	75,000
Edmonton	66,000
Halifax	60,000
St. John	60,000
London	59,100
Victoria	50,000
Number of provinces	11
Members of Senate	96
Members of House of Commons	235
Salary of Governor-General	$50,000
Salary of Premier	$12,000
Dominion Revenue	$434,386,497
Total indebtedness	$3,029,810,341
Land under field crops (1921), acres	52,830,865
Wheat, bushels	300,857,000
Corn, bushels	14,904,000
Rye, bushels	21,455,000
Oats, bushels	426,232,000
Buckwheat, bushels	8,230,100
Barley, bushels	59,709,000
Flax seed, bushels	7,998,000
Potatoes, bushels	107,346,000
Sugar beets, short tons	38,823
Peas, bushels	3,528,000
Beans, bushels	1,265,000
Tobacco, pounds	48,089,000
Butter, pounds	111,691,718
Wool, pounds	21,251,000
Domestic Animals (1921):	
Horses	3,813,921
Milk cows	3,736,832
Other cattle	6,469,373
Sheep	3,675,860
Swine	3,904,895
Fish, value	$49,321,217
Manufacturing establishments	38,344
Capital invested	$3,230,686,368
Raw material used	$1,875,577,799
Value of products	$3,520,724,039
Imports	$1,240,158,882
Exports	$1,210,428,119
Minerals:	
Asbestos, tons	2,063,721
Arsenic, tons	1,491
Cement, barrels	6,327,000
Coal, tons	14,942,418
Copper, pounds	53,461.795
Feldspar, tons	30,540
Fluospar, tons	5,519
Gold, fine ounces	924,374
Gypsum, tons	357,183
Iron ore, tons	59,408
Lead, pounds	67,146,011
Nickel, pounds	19,293,186
Petroleum, barrels (42 gal.)	190,000
Platinum, value	$57,356
Salt, value	$1,641,935
Silver, ounces	13,134,926
Zinc, pounds	53,095,600
Lumber, value	$311,815,293
Public schools	27,968
Teachers in public schools	53,990
Pupils enrolled	1,738,977
Miles of railroad	39,140
Miles of electric railway	1,699

Canadian Literature. See Literature.

Canadian National Park, a pleasure ground of the Canadian Northwest. It lies in the heart of the Rocky Mountains, on the border line between Alberta and British Columbia. It is one of the great parks of the world. The area is 5,732 square miles —3,668,480 acres. The present park was formed by the union of two parks, the Yoho and the Rocky Mountain Park. The Canadian Pacific traverses the park from east to west. Banff may be regarded as the railroad and hotel center. As the park is 70 miles in width and 100 miles in length, no one pretends to be familiar with all the gorges, glaciers, caverns, lakes, hot springs, and waterfalls. The park is full of game, but guns are forbidden. Bears

moose, elk, antelope, red deer, mountain sheep, goats, wolves, even coyotes, and many fur bearing animals abound. The rivers and lakes are full of the grayling, the mountain trout, the rainbow trout, and the salmon trout. Animals from every direction, seeming to know that they are safe within the park, resort thither for protection. A herd of buffalo, the largest on the continent, is domesticated in one of the valleys. There is probably no other place where good hotels are so near to wilderness.

Canadian Thistle, a well known and troublesome weed. It is an emigrant from Europe, where it is known as the field thistle. It is the most slender of all our thistles; the flowers are rose-purple; the heads are small and numerous. The root-stocks creep and interlace, and form extensive mats that defy the plow. The Canada thistle is a plague in old fields, pastures, and waysides. Nothing else can grow where a patch has taken possession, and it is the most difficult of all weeds to eradicate. Quack grass has more vitality and is harder to kill, but it lacks the sharp, prickly leaves. Quack grass affords valuable pasturage, but the thistle is an unmitigated nuisance, not to say, a torment, for stock avoid it like a plague.

There seem to be three common sense ways of exterminating the pest,—cultivating, smothering, and salting. The stalks may be mowed, raked, and dried to clear the way for the team. The thistle sod may then be turned over. If disked early and late and between times through a dry season, literally chopped to pieces and so frequently that no green blade peeps up, the thistles can be killed out. The chances are, however, that a rainy spell or a little neglect during a busy time, as haying or harvest, will enable the thistle to reset worse than ever. The whole secret lies in the principle that no ordinary plant, weed, or grain can live many seasons if prevented from forming leaves and thereby its growth is soon checked.

The second method is dependent on a similar principle. No ordinary plant can live if kept in the dark. If a straw stack or manure pile be left on a thistle patch for a sufficient length of time, the thistle will rot in the ground. A covering of tarred paper, weighted down so that the cracks will not blow open, will answer the purpose. Smothering is a practical plan for small patches.

The third method is dependent on the principle that ordinary plants cannot live in alkaline soil. If enough salt or ashes be spread on the thistle mats to soak the soil with brine or lye the thistle will die, and that right speedily. Subsequent rains will leach the salt or lye out of the soil and distribute it so widely that the field will be none the worse, but rather the better for farming.

Canal, an artificial waterway. Mill races, sluiceways, and irrigation canals are also designed to convey water. As generally used, however, the term canal is applied to waterways permitting the passage of boats and ships. Canals are of great antiquity. The Grand Canal of China is more than 800 miles long. In the prosperous days of Babylonia, Mesopotamia was intersected by waterways. Lower Egypt was well provided with canals. The Romans constructed canals from the lower Rhone to the Mediterranean, and from the Tiber to the sea. The plains of Lombardy were connected with the Adriatic Sea. A canal from the Bay of Biscay to the Mediterranean was completed in 1681. It is 148 miles long. It saves a far-about voyage of 2,000 miles through the Straits of Gibraltar. Holland, Belgium, portions of France, England and northern Germany are covered by networks of artificial waterways. A system of canals connects St. Petersburg with the Caspian Sea. A canal 108 miles long, by way of the Main, connects the Danube and the Rhine.

The first boat canal in the United States was built in 1793 around the Falls of the Connecticut River at South Hadley. There are now about forty inland canals in the United States with an aggregate length of over 2,470 miles. They have cost $200,000,000. They lie chiefly in New York, Virginia, and intermediate territory. One of importance, 196 miles in length, runs from Chicago to La Salle at the head of navigation on the Illinois River. The Ohio Falls Canal is constructed around

the rapids of the Ohio River at Louisville. It is only 11,000 feet long, but is of great importance to navigation. The most celebrated canal in the United States is the Erie, connecting Buffalo on Lake Erie with the Hudson River at Albany, a distance of 352 miles. It was opened in 1825. Its first cost was $7,602,000. The cost of freighting was reduced, however, from $100 a ton to $3.

While digging a ditch through the ground seems very simple, the construction of a canal is really an engineering work of great difficulty. It requires to be carried over waterways on aqueducts. The Erie Canal crosses the Mohawk River on arches twice. The Suez Canal is level from end to end. In case, however, that a canal of this sort would require too deep a ditch in the middle of its course, it must be constructed in sections at different levels, connected by locks. In its simplest form a lock is a water-tight passageway, or a basin fitted with doors at the upper and lower ends. When a boat desires to descend into a lower part of the canal, it enters the basin and the upper doors are closed behind it. The water is then allowed to run out of the basin until the boat has dropped to the level of the section below. The lower doors are then opened and the boat passes on its way. In case it is desired to raise the boat to a higher level, it enters the basin from below, the doors are closed behind it, and water is admitted from above until the basin fills, raising the boat to the level of the upper section. The upper doors are then opened and the boat proceeds on its way. Sometimes a number of locks are built at the same place. In this way a boat is enabled to climb a hill—one step at a time.

Sometimes canal boats are pulled up an inclined plane by steam power. What are known as tank elevators are used in the canals between Belgium and Paris. Peterborough, Canada, has one of the largest canal locks of this sort in the world. It consists of two water-tight steel boxes, each holding 1,300 tons of water. These ascend and descend by hydraulic power, between three great guide towers, 100 feet high, built of solid masonry. When one box is up, the other is always down. A boat enters a box; the gates close; a little additional water is introduced into the other box, and the boat rises swiftly and steadily to the higher level. The operation is almost automatic, three minutes being required to make the lift. The entire lockage is accomplished in twelve minutes. This lock was completed in 1903 at a cost of $500,000.

The Erie Canal has seventy-two locks. Fifty-seven of them are double. Boats are lifted at West Troy 188½ feet, and at Lockport 54½ feet. The total difference in the level of the highest and the lowest section of the canal is 568 feet. The locks of the Morris Canal in New Jersey lift boats 1,084 feet. Canals require to be wide enough so that boats going in opposite directions may pass each other. In ship canals the ship is usually towed by a tug. By far the greatest achievement in canal construction is the Panama Canal. This is treated fully in another article.

Recent canal projects in the United States include the New York State Barge Canal, which is a system of waterways based on the improvement and enlargement of four previously existing canals—the Erie, Champlain, Oswego, and Cayuga & Seneca canals. The Barge Canal improvement involved about 440 miles of new construction, and the canalization of 350 miles of intervening lakes or adjoining rivers, so that the resulting State waterway system, known as the Barge Canal, amounts to about 790 miles. This provides a channel with 12 feet of water, while in lakes and rivers, in which 72 per cent of the whole system lies, the width is 200 feet. There are 35 locks on the Erie branch, 11 on the Champlain, 7 on the Oswego, and 4 on the Cayuga & Seneca. The standard length of lock chamber is 311 feet, and this makes possible the lockage of two 150-foot barges at the same time. The entire project has cost approximately $115,000,000.

The Chicago Sanitary and Ship Canal, which was completed in 1900, connects Lake Michigan with the Mississippi. It is 28 miles in length, has a minimum depth

of 22 feet, a width at the bottom of 160 feet and a width at the top varying from 162 to 290 feet. It was originally designed to carry the drainage of Chicago to the Mississippi instead of to Lake Michigan, and its construction reversed the course of the Chicago River. It extends from the Chicago River inside the city to Lockport, Ill., where it connects with the Desplaines River. The Lakes-to-Gulf deep waterway project contemplates the deepening of the Chicago Drainage Canal and also the Illinois and Mississippi rivers, and the construction of locks so that barges and light-draft vessels can pass direct from the Great Lakes to the Gulf of Mexico.

The Cape Cod Canal, which was completed in 1914, is an artificial channel excavated across Cape Cod, connecting Buzzard's Bay with Barnstable Bay at Sandwich, Mass. This ship canal saves ship-

American Canals.

Showing the cost, date of construction, length, and navigable depth of the principal commercial canals of the United States and Canada.

Name.	Cost of construction	When completed	Length miles	Depth feet
Albemarle and Chesapeake (Va. and N. C.)	$1,641,363	1860	41	7½
Augusta (Ga.)	1,500,000	1847	9	11
Black River (N. Y.)	3,581,954	1849	35	4
Cape Cod	12,000,000	1914	8	25
Cayuga and Seneca (N. Y.)	2,232,632	1832	25	7
Champlain (N. Y.)	4,044,000	1822	81	6
Chesapeake and Delaware (Md. and Del.)	3,730,230	1829	14	9
Chesapeake and Ohio (Md. and D. C.)	11,230,327	1850	181	6
Companys (La.)	90,000	1847	22	6
Delaware and Raritan (N. J.)	4,888,749	1818	66	7
Delaware Division (Pa.)	2,433,350	1830	60	6
Des Moines Rapids (Iowa)	4,582,009	1877	7½	5
Dismal Swamps (Va. and N. C.)	2,800,000	1822	22	6
Erie (N. Y.)	52,540,800	1826	387	7
Galveston and Brazos (Tex.)	340,000	1851	38	3½
Hocking (Ohio)	975,481	1843	42	4
Illinois and Michigan (Ill.)	7,357,787	1848	102	6
Illinois and Mississippi (Ill.)	7,350,000	1895	75	7
Lehigh Coal and Navigation Co. (Pa.)	4,455,000	1821	108	6
Louisville and Portland (Ky.)	5,578,631	1872	2½	..
Miami and Erie (Ohio)	8,062,680	1835	274	5½
Morris (Pa. and N. J.)	6,000,000	1836	103	5
Mussel Shoals and Elk R. Shoals (Tenn.)	3,156,919	1889	16	6
Ogeechee (Ga.)	407,810	1840	3	3
Ohio (Ohio)	4,695,201	1835	317	4
Oswego (N. Y.)	5,239,526	1828	38	7
Pennsylvania (Pa.)	7,731,750	1839	193	6
Portage Lake and Lake Superior (Mich.)	529,892	1873	25	15
Santa Fe (Fla.)	70,000	1880	10	5
Sault Ste. Marie (ship canal)	4,000,000	1895	3	18
Schuylkill Navigation Co. (Pa.)	12,461,600	1826	108	6¼
Sturgeon Bay and Lake Michigan (Wis.)	99,661	1881	1¼	15
St. Mary's Falls (Mich.)	14,087,631	1918	1½	24¼
Susquehanna and Tidewater (Pa. and Md.)	4,931,345	1840	45	5½
Walhonding (Ohio)	607,269	1843	25	4
Welland (ship canal) (Ont.)	23,736,353	1900	26¾	14

Foreign Canals.

Name.	Length miles	Depth feet	Bottom width feet	Cost
Suez, Mediterranean and Red Seas	90	31	108	$100,000,000
Cronstadt, St. Petersburg	16	20½	220	10,000,000
Corinth, Corinth and Ægina Gulfs	4	26¼	72	10,000,000
Manchester Ship, Manchester and Liverpool	35½	26	120	75,000,000
Kaiser Wilhelm, Baltic and North Seas	61	29½	72	40,000,000
Elbe and Trove	41	10	72	6,000,000
Amsterdam	13½	23	88	.....
Panama canal (1915)	50	45	300	375,000,000

ping en route from Long Island Sound to Boston and other New England points, the distance through Vineyard Haven Sound, Nantucket Sound, and around Cape Cod, or about 70 miles. The canal is about 25 feet in depth at mean low water and 100 feet wide at the bottom. From shore to shore the canal is 8 miles in length, but the entire channel excavated from deep water in either bay is 13 miles. The building of the canal has prevented many wrecks which were formerly frequent in the region of Nantucket shoals, and it it now a leading route for coal for New England.

The Sault Ste. Marie Canals, one built by the Dominion government and the other completed by the United States in recent years, are probably the most important to American commerce. These canals, one on the Canadian side and four on the American side of the international boundary, connect the waters of Lake Superior with those of the St. Mary's River and Lake Huron, around St. Mary's Falls in Michigan. While only a few thousand feet long, they are remarkable for their enormous traffic and for having four of the largest locks in the world. About 70 per cent of the commerce of the Great Lakes passes through these canals. The annual tonnage averages over 70,000,000.

While canal construction by government aid continues in the United States from year to year, it may be noted that internal transportation by water, all things considered, has been far from successful, except in the cases noted above. Of some 4,500 miles of canal constructed up to 1914, at an approximate cost of over $200,000,000, more than half, or some 2,500 miles, costing about $80,000,000, had been abandoned. Other artificial waterways have fallen into disuse since. These canals were abandoned because they failed to serve any useful purpose in competition with the railroads. Motor truck transportation on the improved highways of the country likewise lessens the necessity for canals. Many of these canals also were unsuited to modern steam or electric haulage of the barges used in traffic, and towing by horses on towpaths became out-of-date. An official report on Transportation by Water in 1909 stated that there were then in operation canals with a total mileage of 1,360 miles, including branches and feeders of State canals, in New York, Ohio, Illinois and Louisiana. The majority of these were antiquated and inadequate, and with the exception of the improved canals in the State of New York, they were giving but little return to the citizens of the States concerned, for their original cost of over $156,000,000. The construction of the New York State Barge Canal system, which permits of mechanical transportation of barges of large carrying capacity, is an example of canal-building to meet modern requirements.

Canada has built a number of important canals for the improvement of the Great Lakes-Saint Lawrence Water Way. They include the Sault Ste. Marie Canal around the rapids at the head of Saint Mary's River; the Welland Canal to overcome the fall between Lake Erie and Lake Ontario, and canals around the rapids in the Saint Lawrence River, between Kingston and Montreal. The three largest of these canals have a total mileage of 31.2 miles. They can not pass ships drawing over 15 feet of water. The Ottawa-Rideau system includes the Rideau River and Canal. St. Anne's Lock, and the Carillon and Grenville Canals. It connects Kingston with Montreal by way of the Ottawa River. The canal extends only to Ottawa, a distance of 126 miles. The distance to Montreal is 246 miles. The Trent Canal includes a series of waterways, now used locally, but when completed this canal will join Georgian Bay to Lake Ontario. The Chambly canal is around the rapids in the Richelieu River at Chambly. St. Peter's Canal connects St. Peter's Bay on the south side of Cape Breton with Bras d'Or Lake. treated fully in another article.

See ERIE CANAL; SUEZ CANAL; PANAMA CANAL; CORINTH; SAULT STE. MARIE; PARIS; LOCK; NOVA SCOTIA.

Cana of Galilee, a town often mentioned in the Gospel of St. John. The first miracle that Jesus performed took place here: the changing of water into wine. Later he healed the nobleman's son,

who was ill in Capernaum. The site of the town is not certainly known, but it is thought to have been not far from Nazareth. The conditions are best met by Ain Kana, about 8 miles north of Nazareth.

Canalejas Y Méndez, José (1854-1912), a distinguished Spanish statesman, was born at Ferrol, and removed with his parents at an early age to Madrid. He graduated at the University of Madrid, took the doctor's degree, and became a lecturer on literature in 1873. He was strongly attracted to politics, and in 1881 was elected deputy for Soria, in which position he showed marked parliamentary ability. He became under-secretary for the prime minister's department under Posada Herrera in 1883, Minister of Justice in 1888, and of Finance 1894-5. He was president of the Chamber in the Moret administration, and became prime minister and chief of the Liberal party in 1910. It was while holding this position that he was murdered in Madrid, Nov. 12, 1912.

Without doubt Canalejas was one of the greatest figures in contemporary Spanish history. Though radical in his views, he was moderate in his reforms and methods. He was the recipient of many Spanish academic honors.

Canard, kȧ-närd′, the French name for duck. In conversation it is applied to any improbable story, much in the same way as we apply the term fishy, or fish story. A story was once current in Paris to the effect that a flock of starving ducks ate one of their number every day until but one duck remained. It has been suggested that the term, canard, grew out of this improbable anecdote.

Canary, a beautiful little finch, intermediate between the goldfinch and the linnet. It is found wild in Madeira, the Canary, and Cape Verde Islands, where it comes around houses, building nests of moss and feathers. It is a celebrated songster. Its plumage is green, or greenish-yellow in its native home, but, like other domesticated animals, it has developed into a number of varieties. Eggs, pale blue, four or five in number. The female sits thirteen days. Several broods are raised every year. The wild bird is about five inches long. The canary industry is an important one, particularly in the Harz Mountains, where unusually fine birds noted for extraordinary powers of song fetch as high as seventy-five dollars apiece. Hemp seed, canary seed, which is the seed of a grass abundant in the Canaries, millet, poppy seed, bits of green lettuce, and sugar form the best diet for this favorite cage bird. Lime is supplied by a cuttlefish bone. Healthy birds live about fifteen years. See BIRD; GOLDFINCH.

Canary Islands, a cluster of thirteen volcanic islands lying 150 miles off the western coast of Africa. They form a province of Spain. The inhabitants are chiefly of Spanish blood. Population in 1916 was 497,998; area, about 2,808 square miles. The peak of Teneriffe rises to a height of 12,182 feet. It is a welcome landmark to the sailor. The plants are in part those of the Mediterranean region, including the oak, chestnut, pine, cedar, etc., with a few, as the Euphorbia, from Africa. There are 420 species of flowering plants not found elsewhere. The canary bird, the red partridge, and several kinds of lizards abound, but there are no snakes. As in Italy and southern France, the goat is an important domestic animal; but there are several thousand cattle in the islands. Where not too stony the soil is productive, meriting the old name of "Fortunate Islands." A number of fine hotels, together with the attractiveness of the climate, have made the Canaries a favorite winter resort. The exports are chiefly bananas, tomatoes, potatoes, onions, cochineal, sugar, wine, and almonds. Orchards of oranges, lemons, and figs yield abundantly. The women folk are noted for linen drawn-work. See SPAIN.

Cancer, a malignant disease somewhat resembling a carbuncle in appearance. The name is Latin, meaning crab's claw, from the fact that the roots of a cancer, extending in different directions, have somewhat the appearance of a crab's claw. Several kinds of cancer are characterized as hard, soft, black, etc. It is a malady that baffles the skill of the physician. The

only sure cure is removal by the surgeon's knife before the roots have penetrated the tissues too far to be reached.

Other remedies are seldom successful although treatment by X-rays and radium in the early stages of the disease may effect a cure. Most cancers are caused by constant irritation of the affected part by some external cause—as the irritation of the lip from constantly smoking a pipe or the irritation of the breast by a corset. Cancer is the cause of about 93,000 deaths in the United States annually.

Candle, a cylindrical piece of wax, paraffin, or tallow, with a wick running lengthwise through its center. It is designed to give light in burning. In burning the flame melts the fat; the wick absorbs the melted fat and feeds it into the flame. The wick and the fat require to be well proportioned to give the best results. If the wick be too small the light will be dim and the flame too small to melt the fat fast enough. If the wick be too large for the candle the supply of fat will be insufficient to maintain a bright flame. The wick is usually of soft, twisted cotton string. In early England rushes were used for the wicks of rush lights. Scientists have tried, without marked commercial success, to invent a wick that would not need snuffing.

Tallow makes excellent candles. The wax known as spermaceti is from the sperm whale, and is the best material. Excellent wax for candles is made from palm oil. Paraffin is used most commonly in England. Dip candles are made by lowering the wicks into melted tallow or wax repeatedly, allowing each coating to cool and harden before dipping again. Molded candles are made by pouring melted tallow into cylindrical molds of pewter or tin through the center of which wicks have been drawn. The lower end of the mold is closed by a conical cap, in the center of which a hole is left for the wick. The wick is passed through this hole and knotted. The other end is held in place by fastening it to a cross stick. The heated tallow is poured into the mold surrounding the wick and is allowed to harden. The knot is cut at the lower end of the mold, the mold is warmed slightly, and the candle withdrawn. The candle is made up end down, with the top or conical end in the lower end of the mold. Usually a number of candles are molded at the same time. Wax is too sticky and contracts too much in cooling to be run in molds. The wax candles are made by dipping and then rolling to and fro on a flat table to give a smooth, even surface. Large wax candles, such as are burned on altars, are made usually by wrapping a sheet of wax around a wick and then rolling.

In burning, the melted fat is converted first into a gas, which forms a dark, cool spot around the wick. The light produced by a sperm candle seven-eighths of an inch in diameter, and burning 120 grains an hour, is taken as a measure of light giving. It is called a standard candle. A ten-candle electric lamp is one that gives as much light as ten of these candles.

The Chemistry of a Candle by Tyndall is an interesting book.

Candleberry, also known as Bayberry, or Wax Myrtle, a shrub common along the eastern coast of North America, but more abundant in the South and named for its wax covered berries. The shrub grows from 14 to 18 feet high. The berries are boiled and the melted wax is skimmed from the surface. The wax has a greenish-white color, and from it bayberry candles are made. The candles give forth a pleasant, piny odor when burning, and by tradition are associated with Christmas. On Christmas day

> The bayberry candle burned to the socket
> Brings health to the body,
> Joy to the heart,
> And gold to the pocket.

Candlefish, a salt-water fish, which frequents the coast of Alaska. It belongs to the smelt family, and is from 12 to 18 inches long. The name is derived from a custom of the Alaskan Indians who dry the fish and force a rush or strip of bark through for a wick. When the wick is ignited, the fish burns like a candle. This fish contains a large proportion of oil, yet it is not unpleasant to the taste, since the oil has a fine flavor. The oil is extracted

and used as a substitute for cod-liver oil. When fried, this fish is considered superior to trout.

Candy. See CONFECTIONERY.

Candytuft, the popular name of several flowers of the genus *Iberis,* order *Cruciferae,* common in gardens, said to be named from Candia. Some species are slightly shrubby, some are perennials, and some are annuals. The purple and white perennials are familiar in our gardens.

One species, the *Iberis amara,* which is very bitter, is probably a native of England. Other varieties are the sweet-scented candytuft, *Iberis odorata,* and two somewhat shrubby species, *Iberis sempervirens* and *Iberis semperflorens.* This latter variety will blossom almost the whole winter, and is much liked for the whiteness of its flowers. Altogether, there are about a dozen varieties of these flowers.

Canebrake, a thicket of cane. Bundles of the American cane are shipped over the country as "bamboo" fishing poles. Cane grows in almost impenetrable thickets in the bottom lands of Kentucky and southward. Many authorities call cane a bamboo. At all events it is closely related to the larger plant so much used by the natives of southeast Asia. Cane grows from ten to forty feet high with a thickness at the butt of one-half to three inches. Cane is, of course, only a large reed. It belongs, with sugar-cane and broom corn, to the grass family. See BAMBOO.

Canker Worm, the caterpillar of two species of moths, known for its destruction of foliage of shade trees and fruit trees. The females of both species are wingless. The eggs of one species hatch in the spring and those of the other in the fall or early winter. The spring caterpillars have eight white stripes along the back, and those hatched in the fall have six. Both species lay their eggs in the ground. The caterpillar must climb the trees to reach the foliage, and one of the best means of destroying them is to place a band of sticky fly paper, or some other sticky substance around the trunk of the trees early in the spring. Shade trees may be sprayed with Paris green, but this mixture cannot be used on fruit trees with safety. The caterpillars are very destructive and will often destroy the foliage of an entire orchard in a few days.

Canna, a beautiful, brilliantly colored plant, much cultivated for its foliage, or where mass or heavy effects are desired. The leaves are large, usually dark green or dark red, and the flowers mostly red or yellow. The stem is unbranched, from 3 to 14 feet high, while the dwarf varieties sometimes attain a growth of 4 feet. These latter bear large flowers, and the Italian and French varieties are most favored. Cannas are grown either from seed, or by dividing the root-stock and planting in pots. For the successful cultivation of cannas a rich, moist soil is necessary. For mass effects they are set some 6 inches apart after danger of frost is past.

Cannae, an old town of southern Italy, situated on the right bank of the Aufidus, 9 miles west of Barletta. Here on August 2, 216 B. C., Hannibal with an army of 40,000 foot and 10,000 horse defeated a Roman army consisting of 80,000 foot and 6,000 horse, under command of Lucius Aemilius Paulus and Gaius Terentius Varro. Hannibal commanded in person, forming his forces into a crescent, the weakest part in the centre. His plan was based on the hope that the enemy would attack his centre, which it did, the Carthaginians in turn attacking the Romans from both sides. Varro, with 70 knights, escaped, but at least 10,000 were captured, and a large number killed, among them Aemilius Paulus. It is stated above that the battle took place on the right bank of the river, but many trustworthy authorities contend that it was fought on the left bank.

Cannibal, a person who eats human flesh. The word is a corruption of the word caribal, from Carib, a native of the Caribbean region. Allusions to cannibals occur in the most ancient writings. Many savage people consider human sacrifices or feasts of human flesh the most acceptable offering to their gods. The ancient Aztecs and the people of Borneo and of the Fiji Islands indulged in frightful orgies of this kind. The North American Indian believed that devouring the heart

of a brave enemy gave him courage in battle. Downright eating of human flesh for ordinary food is not believed to have been widespread at any time, yet the natives of Malaysia, New Guinea, the South Sea Islands, and parts of western and central Africa were certainly addicted to this habit. A traveler among the Indians of Tierra del Fuego states that in times of scarcity they ate their own people, even in preference to their dogs, the latter being useful in taking game. It is believed that cannibalism is not practiced at the present time, except in very limited, out-of-the-way regions.

Canning, a process of preserving perishable articles of food by excluding agents of decay. The article to be preserved is first heated to sterilize or kill bacterial germs, and is sealed up in sterilized, air-tight glass or metal jars to keep bacteria out. If bacteria within be killed and bacteria without be kept out,—that is, if sterilization and sealing are successful, canned goods keep fresh indefinitely. The process was invented, or rather discovered, in France about the beginning of the nineteenth century, so that no tests of ancient canning are possible; but canned goods sealed up over eighty years ago are still palatable.

Housewives not infrequently seal earthen jars with sheets of writing paper, rendered airtight by a sizing of the white of an egg; but glass jars with metal covers are more convenient and are safer. The jars are usually surrounded by boiling water and filled with boiling hot fruit, the covers are screwed on tight, and the process is complete. If all be done with care and neatness, the jars may be set away for years and not ferment.

The process in large canning establishments is essentially the same. Tin cans are set in hot water, and are filled with boiling hot fruit, vegetables, or fish. The orifice is covered with a piece of tin, which is sealed in place with a soldering iron. An awl hole is left open; the contents of the can are brought to a boil. The hole is then sealed with a drop of solder. If bacteria are excluded successfully, the goods cannot spoil.

The canning industry in America appears to have begun in New York City about 1818 with lobster and salmon; but it has been extended to include all kinds of meats, fowl and fish, vegetables, soups, milk, fruits, not to name a large number of pickles and relishes. Canned goods grew in favor slowly until about 1850, when the rush to the gold fields of California, followed by the Civil War and the opening of the Great Plains and Rocky Mountain regions, created a tremendous demand for all sorts of canned food.

Fifty years ago canned goods were a luxury, relatively expensive, and used only in emergencies, on shipboard, or at remote places where other food was unobtainable. Today their use is universal among the poor as well as the rich. It would be difficult to find a home, hospital, club, hotel, steamer, or buffet car without its assortment of them."

The total number of establishments engaged in canning and preserving fruit and vegetables in the United States in 1920 was 3,082, employing a capital of $223,692,-234 and wage-earners to the number of 60,865. The products of these canning factories for the year were valued at $402,-242,972. Next in order of importance among canners and preservers was the condensed milk industry, with 401 establishments, 13,675 employees, capital of $126,-952,520, and products amounting to $339,-506,774. The fish canneries numbered 410, gave employment to 11,248 wage-earners, were capitalized at $63,049,038, and produced over $77,000,000 worth of canned fish, principally salmon, for the market. Oyster canning employed 65 establishments, with products of about $3,000,000. Canned meat products are in a large class by themselves.

Salmon canneries are located chiefly on the Pacific Coast, and usually close to the water's edge. The largest are in Oregon, Washington and Alaska. Greater care is required in this industry than in the canning of fruit or vegetables, because of the rapid decay of fish after being taken from the water. When received from the fishermen the salmon are placed in an icy bath, dressed and again washed; after which

they are machine-cut into pieces to fit the various sizes of cans. The cans, when packed, are tightly soldered and subjected to such intense heat that the fish are thoroughly cooked, and the bones softened. A small hole is then punched in each can to permit the escape of steam, and the cans are then again steamed, washed in lye to remove grease, and labeled for shipment.

In both commercial and household canning and preserving, the preservatives commonly used are vinegar and spices for fruits; salt for vegetables; salt, vinegar, and spice for making pickles; and salt, spices, etc., in canning meats and meat products. In commercial canning, however, other preservatives, such as benzoate of soda, benzoic acid, formalin, etc., have also been used to such an extent that this matter has been dealt with by Federal and state legislation, in the interest of the public health. All commercial canners are subject to the provisions of the Federal Food and Drugs Act, which defines adulteration and prohibits the use in canned food of "any added poisonous or other deleterious ingredient which may render such article injurious to health." The Federal law permits the use of benzoate of soda, when its presence in canned goods is stated on the label. Canned vegetables are usually free from any kind of adulteration, except an unnecessary amount of water. Artificial color is sometimes used with tomatoes. Tomato ketchup is commonly colored and preserved artificially. But of all canned and preserved goods, jellies, jams, and marmalades are most frequently adulterated with artificial coloring and preservatives. No fresh fruit at all is used in the cheapest of these products, which consist entirley of a compound of glucose with apple peelings and cores, colored by artificial means. A jelly made of apples and glucose may be artificially colored to sell as strawberry, grape or currant jelly; and the pure food legislation of recent years has been designed to prohibit the use of all coloring matter, etc., which is unwholesome, while permitting the use of all ingredients that are safe.

Canning Clubs, the term applied to organizations of girls and young women in many states for the purpose of encouraging the home-canning of food products, including meats, fruit and vegetables. These organizations are fostered by the extension work of state colleges of argriculture and local agencies, in cooperation with the United States Department of Agriculture, and are rendering valuable service to many communities by promoting a knowledge of home economics. Clubs for boys, organized on a similar plan in rural communities, are also doing good work in spreading a knowledge of improved methods of agriculture; and the cooperation of boys and girls in these activities on the farm and in the home is helping to solve some of the acute problems of rural life. The World War period, with its great and pressing need for the conservation of food, gave a decided impetus to the organization of canning clubs, and by the year 1920 many of their members were selling their products on a commercial basis. More meats and vegetables were canned than in any preceding year, and in the northern and western states, for instance, the use of a pressure cooker for canning these products was demonstrated by hundreds of girls' club members in their homes, for the benefit of their neighbors. Incidentally the girls doing this work, and the boys in their similar clubs for corn-growing, stock-raising, and other agricultural purposes, have gained in responsibility and initiative. Thus many girls, besides doing all the canning for their homes, have come to be recognized as authorities on canning, and some are employed to can foods for the women of their own and other communities.

The commercial phase of canning seems to be one of increasing interest to the older club demonstrators in several States reporting through county extension agents to the agriculture colleges. Some of these older girls have formed themselves into stock companies for canning on a larger commercial scale than can be done individually. All those reporting for 1920 proved successful and were planning for more extended work. With the present nation-wide interest of rural people in cooperative effort, the demonstrations of club boys and

girls are becoming increasingly important in furthering the worth-while practices worked out in the research departments of the state colleges and the United States Department of Agriculture. The active participation of young people with the adults in carrying out a community program of work, thereby solving many farm and home problems, is one of the most important features in the progress of club work. During 1920, in the North and West, reports to the Department of Agriculture show that 851 county organizations provided for the participation of young people's clubs in bettering farm, home and community life. Of this number, 636 offered membership to boys and girls, and 1,500 leaders in community work conducted demonstrations with boys and girls in organized club groups. In the East and South the rural club movement has also made considerable progress.

Before a canning club can be successfully organized in a community there must be a local leader or a leader who knows how to work with girls, and who has a practical knowledge of canning methods, especially the cold-pack method, and knows the place of fruits and vegetables in the diet. Members enrolling in Illinois, for example, must be between 12 and 20 years of age, must attend meetings regularly, and make at least one exhibit of their work each season. In the first year, each girl member must learn the cold-pack method and can at least twenty quarts, including two fruits and two vegetables. This minimum requirement may be increased by vote of the club members. In the second year, each member must can a larger quantity and a larger number of fruits and vegetables. The minimum may be determined by the club. Work begins with jams, jellies, preserves, pickling, etc. In the third year, the member continues more advanced work with fruits, vegetables, jellies, jams, preserves and pickles, and must study and, if possible, invest in labor-saving and time-saving devices and equipment. If the club members can put up standard products for sale, and wish to do so, it is suggested that canning in tin should be considered in the third year.

Topics discussed at canning club meetings include the following: Methods of canning; why foods spoil—bacterial, yeasts and moulds; kinds of jars and rubbers—how to test; canning for exhibit; fruits which make good jelly; various ways of pickling; advantages of the cold-pack over the open-kettle method; recipes for jams and preserves; standard packs for products to be sold, etc.

The canning project is one which lends itself readily to demonstration work, and every club should have a demonstration team. Agricultural colleges and the Bureau of Farm and Home Economics, United States Department of Agriculture, furnish helpful literature for the encouragement of canning clubs.

Cannon, large guns for hurling projectiles by means of explosives. Cannon were used by Edward III against the Scots in 1327; by the French against the Flemish in 1338; and by the English at the battle of Crecy and at the siege of Calais in 1346. The first cannon were built like a keg, of iron bars surrounded by hoops and iron rings. The first cannon balls were made of stone. The largest American cannon in 1918 threw a projectile less than 20 miles. In March, 1918, a German Big Bertha with a range of 75 miles sent shells into Paris weighing 330 pounds, traveling twelve miles above the earth with a speed twice as great as sound. By November the French had a bigger gun to bombard Metz. It weighed 200 tons. A single 3,200-pound shell paralyzed and deafened a whole garrison at Malmaison. The gun is a 52 cm., the largest in existence.

Cannon, George Quayle (1827-1901), an American leader of the Latter-day Saints, was born in Liverpool, England. He came to the United States in 1844, and became one of the first settlers of Salt Lake City. He translated the Book of Mormon into the Hawaiian language after his return from Hawaii in 1850. He was editor of the *Western Standard* and the *Desert News* at various periods. In 1862 he was sent to Washington to urge the admission of Utah as a state, and from 1872 to 1881 was the Territorial Delegate of Utah to Congress, where he was seated after much

controversy, owing to his being a Mormon. He held many positions of importance in his church, first as councilor and later as member of the Legislative Council of Utah, in 1865, 1866, 1869, 1871, and 1872. He wrote several pamphlets in favor of Mormonism, and also a biography of Joseph Smith. In all his work and writings Cannon was a warm defender of Mormonism, and fought to uphold its teachings.

Cannon, Joseph G. (1836-), an American statesman. He was born of Quaker parentage, at Guilford, North Carolina. The family removed to Illinois, where the young man worked in a grocery store and studied law until admitted to the bar. He was state's attorney of Vermilion County, 1861-68, and in 1873 was elected to Congress by the Republican party, and served continuously till 1891 when he went down to defeat in the general Cleveland landslide. In 1893 he was again returned to Congress and has been re-elected at each recurring campaign since that time. From 1903 to 1911 he served as speaker of the House, ruling that body with an iron hand. He gradually lost his following among the representatives as the so-called insurgent movement among the Republicans gained ground. He was unswervingly allied with the "standpat" element in the party, which cost him the confidence of the country at large. Just at the close of the session in the spring of 1911, his opponents had gained sufficient strength to appeal successfully from his decision in one of the most dramatic incidents ever witnessed in the House.
After serving fifty years Mr. Cannon retired to private life at the close of the 67th Congress.

Canon Law, a term applied to the rules or canons laid down by a church or a religious order for the guidance of its followers. The most important example is the code of the Roman Catholic Church. It had its origin in Scriptural teachings and has been determined by the pope or by councils of the Church under his direction, some twenty in number, beginning with the Council of Nicaea in 325. With its many additions and revisions it has become an extensive code.

Canoe. See BOAT.

Canossa, a mountain castle of the Apennine region, one-third of the way from Bologna to Genoa. It is about twelve miles southwest of the railroad station of Reggio. In 1077 it was the temporary residence of Pope Gregory VII. He required Emperor Henry IV of Germany with whom he had a serious quarrel to come to Canossa for absolution. Henry, it is said, made supplication at the gate for three days, bareheaded and barefooted, before the pope consented even to see him. To go to Canossa is, therefore, a proverbial expression for abject surrender, humiliation.

See GREGORY VII.

Canova (1757-1822), a celebrated Venetian sculptor. He is one of the most noted artists of modern times. His favorite material was Carrara marble. His subjects were both classical and modern. A list of fifty titles would be required to do justice to his work. Some of the classical subjects selected for his mallet and chisel were Theseus, Cupid, Psyche, Hercules, Venus, Hector, Ajax, and Apollo. He executed several effigies, or tombs, of wondrous white marble, having great skill in making cold marble lie in soft, fleecy folds, as the drapery of a recumbent figure. A statue of the king of Naples, a bust of Napoleon, and a colossal statue of our own Washington in a sitting attitude are some of his more modern achievements. In 1816 Canova induced the French to restore the art treasures of Rome, which had been carried off by Napoleon. His name was enrolled by the pope in the Golden Book as one who "deserved well of the city of Rome."

Canovas del Castillo, Antonio (1828-1897), a Spanish statesman and man of letters. He was born and grew up at Malaga. At an early age he entered the field of journalism and allied himself with the Liberal Party by whom he was elected to the Cortes in 1854. His rise into prominence was rapid, and he became a leader in the movement which placed Alfonso XII on the throne. He was several times prime minister; and was again serving in that capacity, when he was killed by an anarchist.

Cantabri, the rudest and perhaps the most valiant of the inhabitants of ancient Spain. These bold mountaineers dwelt in what was then known as Cantabria, the northwest part of the Iberian penninsula near the Bay of Biscay. The general name Cantabrian Mountains is still used for the various ranges extending along the north of Spain west of the Pyrenees. They are known chiefly for their brave opposition to the Roman arms in the Cantabrian War of 25-19 B. C. The Emperor Augustus in his efforts to extend the Roman arms to the limits of Europe on the west, sent Tiberius across the Pyrenees into Spain. In various campaigns extending over six years this was accomplished, but with heavy losses. The Cantabri who retired to their mountain fastnesses were never fully subjugated.

Cantaloupe, a variety of muskmelon, known also as rockmelon. The melon is from Asia; the name is from Italy. The melon was brought from Armenia, it is believed, to the papal gardens at Cantaluppi, near Rome. As distinguished from the nutmeg varieties, a cantaloupe is any furrowed muskmelon having a hard, warty rind. The flesh may be white, green, or yellow.

A small, hard, rough cantaloupe, with green, fibrous flesh of rich, sweet flavor, has been developed by the growers of Rocky Ford, the county seat of Otero County, in southeastern Colorado. Gardeners call this variety the Netted Gem, but it is known the United States over as the Rocky Ford cantaloupe. The Colorado melon district is a belt of rich, irrigated land in the valley of the Arkansas. The business began in the eighties with small shipments to the Denver market. The peculiar adaptation of the soil to the raising of the melon and its acceptability in the market have encouraged growers, until the cantaloupe crop is the chief dependence of a large section of which Rocky Ford is the chief station.

Cantaloupe raising has had quite a history. It is easy enough to raise cantaloupes. With rich soil, sunny skies, and irrigation, one summer is like another; the grower is independent of season. The loss or profit lies in the manner of marketing. At first, shipments were made by individual growers by express. The rates ate up the profits. Too many melons were dumped on the market at a time. Owing to rumors of high prices, one city might have an over supply, while another had none. The growers learned to coöperate in 1896. A group of farmers arranged to combine their melons and ship by freight in car lots to Kansas City and St. Louis. The first cars sold to advantage. Later shipments were sold at a loss.

The next season an association of practically all the growers in Otero County was organized. One hundred and twenty cars were sent to the St. Louis market. This year established the fame of Rocky Ford and brought the grower profit. In 1898 disaster came. Large plantings were made. Eight hundred growers associated. Arrangements were made to ship under contract to a single St. Louis firm which had established agencies in New York, Pittsburg, and other Eastern cities. Five thousand acres of melons were ready for daily picking. Rocky Ford was a busy station. As high as twenty-eight cars were sent off daily. The markets were glutted. Melons spoiled in transit. A hundred cars were thrown into New York harbor. The Santa Fé railroad cancelled freight charges on spoiled car lots, but the commission house was able to pay the growers' association less than a third of the contract price.

It is difficult to get farmers to hold together even under favorable circumstances. The disaster wrecked the large association, and many growers turned their attention to sugar beets. The notion of coöperation survived, however. Many smaller associations were formed with a central steering committee. Standard Rocky Fords are now shipped in crates holding forty-five melons. The "ventilator" car of early shipments has been replaced by large refrigerator cars in which some 366 crates can be sent to any corner of the Union. Melons arrive in as firm and sound condition as when they started. The distribution is controlled almost entirely by commission houses in Pittsburgh, New York, Chicago and other large cities.

Imperial Valley, California, has become one of the leading cantaloupe-producing regions of the country.

Cantata, kän-tä′tȧ, originally a musical composition for one voice including both melody and recitative. The term has come to be applied to a class of musical compositions comparable with oratorios and operas, but shorter and less pretentious than either. The cantata is arranged for several, sometimes for many voices. It includes solos, choruses and interludes. The oratorio is dignified, its theme is sacred, moreover it is purely musical. The cantata may have a sacred theme or it may be light in character. If the theme be sacred it is of a simple nature, less symbolic than that of the oratorio. The cantata may combine music and drama. It then resembles the opera, but is presented, usually, without scenic accessories. See ORATORIO; OPERA.

Canteen, Army. Literally a canteen is a soldier's drinking cup. The name is applied commonly to a shop in garrisons and barracks where a soldier may purchase refreshments of various sorts. In the American army the canteen or post-exchange for many years derived its profits from the sale of beer and light wines. In 1901 Congress passed a law prohibiting the sale of intoxicating liquors in any canteen, post-exchange or army transport. The canteens were soon closed, presumably because there was no profit in running them without liquor. Soldiers were thus deprived of the opportunity of purchasing small comforts or meeting each other socially without going outside the camp. Therefore, in 1902 and 1903, Congress voted $500,000 to support canteens. In the World War canteens were maintained by social organizations.

Canterbury, a cathedral city of east Kent. It was the capital of the ancient kingdom of Kent. It lies fifty-six miles from London on the highroad from that city to Dover. It was the original seat of Christianity in Great Britain. It is situated in a fertile valley among green hills, and presents a picturesque appearance from whichever side it is viewed. There is a considerable local industry in brewing. The present population is about 25,000. There are local manufactures of beer, leather, brick, lime, and ropes, as well as a local trade in grain and hops. The chief feature of the town, however, is a magnificent Gothic cathedral. The original buildings have all been destroyed. The present edifice has been built at several different times. It is not uniform in style, but is very impressive. It is 530 feet in length and 154 feet in breadth. The main tower, 235 feet in height, is one of the finest in England. The material is a yellow stone from Caen, France. The Archbishop of Canterbury is the primate of the Church of England. He places the crowns on the heads of the king and queen at their coronation, and, wherever they may be, he regards them as his parishioners. Canterbury formerly contained the shrine of Thomas à Becket, to which pilgrimages were customary in the days of Chaucer. Although Becket's shrine was demolished in 1538 by Henry VIII, a number of interesting monuments are still to be seen. See LAMBETH PALACE; CHAUCER; BECKET; ANGLO-SAXON.

Canterbury Tales, The, a collection of stories by Chaucer, first printed in 1475. The work consists of twenty-two poems and two prose tales, told by a company of pilgrims on their way to Canterbury. See CHAUCER.

Canton, a large city in China. The population of the city with its suburbs is estimated at 1,600,000. It is inclosed by brick walls twenty-five feet high and twenty feet thick, having a circuit of over six miles. There are a dozen gates. All close at night-fall, oriental fashion. The streets are straight, clean, and narrow. Goods are carried on bamboo frames, a man walking at each end. Common people walk; the aristocracy are carried in sedan chairs. There are many imposing temples, among others two lofty pagodas. The prevailing religion is Buddhism. The city is situated on the Pearl River about eighty miles from the sea. Wharves extend for several miles. A very great number of houseboats, as many as 20,000 or 30,000, crowd the river. It is thought that 200,000 people have no other home. Families live for generations in these

floating dwellings. They catch a few fish, but make their living chiefly by conveying merchandise. Canton merchants are shrewd business men, noted for their honesty. The foreign business, chiefly with the United States and Great Britain, amounts to about $40,000,000 a year. European ships began to visit Canton by way of the Cape of Good Hope in 1517. See CHINA.

Canton, a city of Ohio, county seat of Stark County. It is in the midst of a rich agricultural region, and deposits of coal, limestone, and pottery clay are near by, but the city's chief interests are in the line of manufactures. Among manufactured products are watches and watch cases, dental chairs, stoves, farming implements, metal ceilings, metal office furnishings, machinery, and iron bridges. There are also rolling mills and steel works. The city has paved streets, electric lights and street railways, is served by several railroads and has two parks and a beautiful lake resort. There are schools, churches, newspapers, banks, hospitals,—all the requisites for a flourishing modern city. In 1907 a national monument was erected here in honor of President McKinley, whose home for many years was at Canton. According to the census of 1921 the population is 1,376,000.

Cantonment, a term long applied to temporary quarters for troops, and in India to permanent military towns. It became familiar in American usage soon after the United States entered the World War, in 1917. Sixteen great camps, each comprising hundreds of wooden structures, were established by the war department for the training of the new national army, the members of which were chosen under the selective draft law. These camps were called cantonments, to distinguish them from the sixteen similar camps established for the training of the national guard. They were named after famous soldiers of the U. S. Army, as Camp Grant, Camp Custer, Camp Funston, etc.

Canute. See KNUTE.

Canvas, a dense, heavy, plain-woven cloth of unbleached hemp or flax. Canvas may be of many weights and qualities. It is used for a variety of purposes for which strength and durability are required. The heavier grades are used for tents, and for the sails of ships. Ships with all sails spread are said to be under heavy canvas. The smoothest varieties are used as a ground for embroidery and, stretched on frames, for oil paintings. Artitsts sometimes speak of paintings as canvases. Many grades are used by tailors and dressmakers to stiffen certain parts of garments. See BAYEUX TAPESTRY.

Canvasback, a large fresh-water duck, native of North America. Because it is a table delicacy, this bird was in danger of extermination by hunters until restrictive laws were passed for the protection of it and other game birds. The canvasback breeds in the northern United States and in Canada, migrating southward in winter. The adult male has a reddish head, black bill, light gray back and sides, so marked with wavy lines and dots as to appear like coarse canvas. The fore part of the body, rump and tail coverts are black.

Canyon. See GRAND CANYON; COLORADO RIVER.

Caoutchouc, koo'chook, another name for rubber. See RUBBER.

Cap, a head covering provided sometimes with a visor, but without a brim. The cap was unknown among the ancients.

Capaneus. See SEVEN AGAINST THEBES.

Cape Breton Island, an island of northeastern Nova Scotia. It is separated from the peninsula of the mainland by the Strait of Canso, sixteen miles long and nowhere to exceed two miles in width. A deep bay cuts the island almost in two. The island was settled first by the French, who called it Isle Royale. It was defended by the fortress of Louisburg. The island was ceded to Great Britain in 1763, and was united to Nova Scotia in 1820. Area, 3,120 square miles. Population, 1921, 131,495. The chief town is Sydney. A superior quality of bituminous coal is mined there. See NOVA SCOTIA.

Cape Cod, a curved cape and peninsula forming the southern boundary of Massachusetts Bay. It is about sixty-five miles in length and varies from a mile to twenty miles in width. The surface con-

sists largely of bogs and shifting sands. The inhabitants are engaged in fishing and other occupations, depending largely on the sea. A canal has been completed to shorten the distance by sea from Boston to southern ports. Cape Cod was discovered by Captain Gosnold in 1602, and the name was given because of the number of codfish taken near it. Thoreau has written a very interesting volume, entitled *Cape Cod,* in which he makes many shrewd and instructive observations. The chief town is Provincetown, reached by rail. See DUNES; CRANBERRY; GERRYMANDER.

Cape Hatteras, a sandy spit forming the most eastern point of North Carolina. It is separated from the mainland by a shallow body of water called Pamlico Sound. The meeting of cool breezes from the north with the land breezes and the hot air of the Gulf Stream creates storms here, making the vicinity of Cape Hatteras as one of the most dangerous regions on the Atlantic coast. A large lighthouse with powerful lamps is maintained by the government to warn ships off the shore. The latitude of the lighthouse is 35° 15′ 14″ N.; longitude, 75° 31′ 17″ W. Birds migrating southward are dazzled by the light, and strike the tower in great numbers. Collectors obtain many rare specimens in this way.

Cape Horn, the southern point of the most southerly island of South America. Latitude, 55° 59′ S.; longitude, 69° 16′ W. It is a precipitous rock over 500 feet high. Currents from the Pacific and the Atlantic meet here, and fierce storms make the passage one much dreaded by sailors. It was named in 1616 by Dutch navigators from the town of Hoorn, Holland. English people have dropped an *o* out of the name. Sailors avoid rounding the Horn by taking a short cut to the northward through the Straits of Magellan. A floating cask is used as a postoffice. Passing ships send off a boat to leave and take mail. See MAGELLAN.

Cape of Good Hope, a promontory near the southern extremity of Africa. Cape Agulhas, 100 miles to the southeast, is the extremity of the continent. Cape of Good Hope is situated in latitude 34° 21′ S.; longitude 18° 30′ E. It was discovered in 1487 by the Portuguese navigator, Bartholomew Diaz, and doubled again by Vasco da Gama in 1497. These navigators were exploring the coast in search of a sea route from western Europe to India. Diaz named it "Cape of Storms," but King John of Portugal, who had high hopes of commercial advantage from the new route, insisted on the present name. The promontory follows a curve perhaps thirty miles in length. The very tip is known as Vasco da Gama Hill. Table Mountain, a flat-topped elevation, 3,585 feet high, is about thirty miles from the tip. The name is taken from the flat table-like top, but it is rendered still more appropriate by the mists and clouds which not infrequently spread over the surface and hang over the sides like a table cloth. A British naval station is maintained within the eastern shelter of the Cape. Cape Town nestles at the foot of Table Mountain, fronting a bay that opens to the west. See GAMA; DIAS.

Cape of Good Hope, a province in the union of South Africa, occupying the southern point of Africa. Settlements were begun by the Dutch in 1652. The British took possession in 1795 and forced a sale to themselves at $30,000. The colony has been enlarged by successive additions, until it comprises not only the territory lying south of the Orange River, but a considerable interior tract north of that river, in all an area of 276,995 square miles. It is now larger than Texas. The former and seemingly more appropriate name of Cape Colony has been changed to Cape of Good Hope Colony. The population in 1921 was returned at 2,781,185, an average of 8.7 per square mile. Three-fourths of the inhabitants are colored. Half of the white people are Dutch.

The government consists of a governor and an elective parliament of two houses. English is the official language, but members may address the house in Dutch if they so prefer. Elections are by ballot. Electors must be householders, occupying a house worth $350, or be earners of a salary of not less than $250 a year. In

addition, a voter must be able to write his own name. These precautions are taken to shut out the ignorant natives; but the line, as enforced, is an educational and property line, not a color line. Attendance at school is not compulsory. White children are provided with public and private schools. About one-sixth of the negro children are in school.

The principal towns are Cape Town and Kimberley. The surface is rugged and elevated; large portions of the country are still in a state of nature. The forest still shelters the African elephant. The baboon still haunts the rocks. The leopard, jackal, and antelope are found in the plains. The lion and giraffe are extinct. The ostrich is now bred in captivity for the sake of its feathers. Over $9,000,000 worth were exported in 1907. Diamonds, gold, copper, valuable woods, grain, fruits, wool, sheep, feathers, and hides are the chief exports. In 1907 colonial products to the amount of $220,000,000 were exported, chiefly to London.

The mean temperature at Cape Town is sixty-two degrees. Generally speaking, the colony is lacking in rainfall. Irrigation is carried on extensively. One reservoir covers nineteen square miles and holds 35,000,000,000,000 gallons of water. The growing of wheat is an important industry, over 3,728,000 bushels being produced in 1921. Other products are oats, barley, rye, oat-hay and wine. A great number of horses, cattle, sheep, pigs, goats and ostriches are also raised.

There are in the province many schools and a number of colleges; also many libraries, churches, and newspapers.

Caper, a trailing shrub growing on old walls, rubbish heaps, and the like in Mediterranean countries. The unopened flower buds when put down in vinegar are called capers. These pickles are much used, especially in making caper sauce to serve with boiled mutton. The taste is sharp and bitter, quite unpleasant to those not accustomed to it. Travelers speak of the profuse white and purple flowers as an ornament of the rubbish heaps and ruins of the Levant. The plant was introduced into Great Britain as early as 1596.

Capercailzie, kā-per-kāl′zĭ, a fine, large bird of the grouse kind. The male bird weighs up to fifteen pounds. Its plumage is variegated,—black, brown, and white with a dark green breast and a patch of naked scarlet skin over one eye. It is found in extensive woods, and is often called the "cock of the woods." It feeds on berries and buds and the tender shoots of fir. Formerly common to northern Europe, it is now confined to the evergreen covered mountains of Scotland, Scandinavia, Russia, and possibly portions of Asia.

Capetians, or **House of Capet,** a royal family of France, reigning 987-1547. Hugh Capet, the first of the line, was elected by a council of nobles and clergy to succeed Louis V, the last of the Carolingians. He was a lay abbot and wore a capet, or abbot's cape, of gray wool,—hence the name Capetian. Hugh was crowned king of the Gauls, Bretons, Danes, Normans, Aquitanians, Goths, Spaniards, and Gascons. It remained for the Capetians to weld together these diverse elements and create a nation. The provinces of France, each under its own ruler, had the notion of states' rights. The king had no power of general taxation. His income came from his own possessions. He had his local army, as each feudal lord had his; but there was no national army. Each feudal lord legislated for his own territory; there were no national laws enforced by central authority. To overcome these evils and create France, the unit, was, therefore, the work accomplished by the descendants of old Hugh Capet. The crown passed from father to oldest son eleven times, then twice to younger sons, then in 1328 to a cousin, Philip VI. He and his successors were Capetians by blood, but are known as the House of Valois. Indeed, all the later French kings were descended from Hugh Capet. The following table gives the Capetian kings with the dates of accession:

Hugh Capet....	987	Philip II (Augustus)	1180
Robert II.....	996	Louis VIII.....	1223
Henry I.....	1031	Louis IX (the Saint)	1226
Philip I.....	1060	Philip III.....	1270
Louis VI.....	1108		
Louis VII.....	1137		

Philip IV (the Fair)	1285	Charles VI	1380
Louis X	1314	Charles VII	1422
Philip V	1316	Louis XI	1461
Charles IV	1322	Charles VIII	1483
Philip VI (Valois)	1328	Louis XII	1498
John	1350	Francis I	1515
Charles V (the Wise)	1364	Henry II	1547
		Francis II	1559
		Charles IX	1560
		Henry III.	1574-1589

There is no other modern nation which owes so heavy a debt of gratitude to its ancient line of kings as the French. France, as it exists today, and has existed through all modern history, with all its glorious achievements, is their creation and that of no one else.—George Burton Adams.

Cape to Cairo Railway, a British project for the construction of a continuous railway from the Cape of Good Hope to the city of Cairo on the Nile. It was begun in 1889, and when completed will constitute the trunk of a vast system of steamboat, motor, and rail connections destined to make the "Dark Continent" glow with the light of civilization. The World War hastened its progress, that it might serve the Belgian military expedition against German East Africa. The length of the route is about 6,800 miles, the longest railway line in the world. London papers used to discuss the Cape-to-Cairo idea much as we would discuss a line to the moon, but now the idea is like a dream come true.

Latest reports of progress on this venture state that except for 289 miles that must be covered on foot or by caravan, the entire journey may now be made in comparative comfort. The two points on the route that cannot be traversed by boat, motor or rail are a 200 mile stretch in the Tanganyika Territory, and one of 89 miles around the rapids of the upper Nile. No great progress has been made in the last few years, however.

Cape Town, the capital of Cape of Good Hope. It is situated at the foot of Table Mountain, about thirty miles from the tip of the cape, and fronts Table Bay, opening upon the Atlantic westward. The town was well laid out originally by the Dutch, who still form over half of the white population. Travelers are interested in Table Mountain, the Cape Astronomical Observatory, and a botanic garden of fourteen acres. The city is well built. There are many fine churches. The most prominent is the Roman Catholic cathedral. The capitol is a commanding edifice of recent construction. Cape Town is the educational and commercial center of South Africa. The harbor is protected by a breakwater nearly a mile long. There are two large docks affording opportunity to repair ships and to scrape off barnacles. The Great Western Railway, the first link in the Cape to Cairo route, runs north from Cape Town. The population in 1921 was 206,558.

Capillaries, in anatomy, fine hair-like tubes or blood vessels that lead from the ends of the arteries to the beginning of the veins. The diameter of a capillary is such as to allow a roll of blood disks or corpuscles to pass freely. They are so numerous, and they form so fine a network in ordinary parts of the body, that some are sure to be pierced by the prick of a pin. See BLOOD; CIRCULATION.

Capillar'ity, the phenomenon exhibited by liquids in their tendency to rise or be depressed near the walls of a containing vessel or within tubes thrust into the liquids. It is due to the relative attraction between the particles of the liquid for each other and for the material of the vessel. If the liquid adheres to the tube or wets it, as when a glass tube is put in water, it rises in the tube; if it does not adhere, as in mercury, it is depressed. The smaller the tube, the greater the elevation or depression.

Familiar examples of this same principle are the rise of ink in a blotter, or of oil in the wick of a lamp. By it also sap rises in trees, and fluids circulate through porous animal tissues. Capillarity is the explanation of the ability of water to rise above its natural level in soils and to furnish moisture for vegetation impossible without it. When the soil is compact so that the spaces are small, the moisture rises readily and is lost by evaporation. If, however, the surface is broken up, loosened and pulverized this loss is prevented. This is one of the means by which moisture is conserved in semi-arid regions, and is a principle in so-called dry-farming methods. See DRY FARMING.

Capitalism, the modern system of wealth production, is usually dated from what is commonly termed the "Industrial Revolution," which occurred in the last quarter of the eighteenth century. What is known as the "Industrial Revolution" was caused by the introduction into industry of steam as power, and the subsequent use on large scale of complex machinery as an aid to the production of commodities. The system of production that immediately preceded capitalism in the western world was the guild system, under which the individual worker was the owner of his tools, and, in consequence, master of his economic life. This is not to say, however, that no one accumulated, under this system, what in the modern sense is called capital. But the introduction of machinery into industry rendered the guild system obsolete, and divorced the individual worker from the tools of production, since, obviously, it was not possible that each worker could become a machine owner.

This of course gave rise to an entirely new industrial relationship—that of the employe to his employer, and that of the capitalist to the commodity-using public. The rapid development of machinofacture made it impossible to maintain the original simple industrial organization; such large projects as the building of railroads could not be carried through by one person, for the expense involved was too great for one person to bear. There arose, therefore, the joint stock company—a company formed by several persons who pooled their resources for the purpose of financing great undertakings.

Advancement of all lines of industry increased in rapidity, and redounded to the public benefit in softening everyday life and in insuring more leisure for cultural pursuits. But great fortunes, amassed in industry, appeared; and these, existing beside the worst forms of poverty, gave rise to criticism such as has never been directed against any other human institution. Some of this criticism is just, since capitalism is not without faults that may be corrected, while some of it is considered unjust by almost everyone except the critics. In its most violent form, this criticism says that industry should be maintained socially, since the products of industry are designed for social use. As is pointed out, however, had certain persons not devoted all of their time and risked their wealth to establish and maintain this system of production, civilization would not have advanced as far as it has.

Expansion and intensification in industry continue, and capitalism sends its products to the backward places of the world. The natural resources of isolated regions are discovered and developed, and social wealth increases. Many early abuses of capitalism have been corrected, and serious attempts are being made to establish ever more harmonious relations between capital and labor, employer and employe.

Capitals of the United States. Since the adoption of the Declaration of Independence, nine different cities other than Washington have been for longer or shorter periods the seat of government of the United States. The famous Continental Congress which adopted the Declaration sat in Philadelphia from September 5, 1774, to December, 1776, but during the Revolution, in order to avoid the British, it was necessary to make frequent changes in regard to the meeting place of Congress. The list covering the period from December, 1776, to June, 1790, is as follows:

Baltimore, Dec. 20, 1776, to Mar., 1777.
Philadelphia, Mar. 4, 1777, to Sept. 1777.
Lancaster, Pa., Sept. 27, 1777, to Sept. 30, 1777.
York, Pa., Sept. 30, 1777, to July, 1778.
Philadelphia, July 2, 1778, to June 30, 1783.
Princeton, N. J., June 30, 1783, to Nov. 20, 1783.
Annapolis, Md., Nov. 26, 1783, to Nov. 30, 1784.
Trenton, N. J., Nov. 30, 1784, to Jan., 1785.
New York, Jan. 11, 1785, to June, 1790.

Philadelphia was the temporary capital until 1800, but the Constitution, drafted in 1787, had made provisions for the selection of a Federal district and a national capital. President Washington chose a site on the Potomac, and in 1800 the city of Washington became the seat of government.

Capital Punishment, the taking of life as a penalty for wrongdoing. In England, prior to the American Revolution, 160 offenses were punishable with death. Among these were shoplifting, or stealing in shops to the amount of five shillings, and counterfeiting revenue stamps placed on perfumery and hair powder. Stealing a sheep was visited with the same penalty as killing a man. The main object of punishment being to deter others from committing crimes, the advisability of capital punishment has been questioned; imprisonment for life has been suggested, but few believe that a life sentence is dreaded as much as a death sentence. In England and other civilized countries death is now the penalty for murder and treason only. In the army and navy, offenders may be shot for various military offenses, including desertion and disobedience, and dangerous neglect of duty. President Lincoln interfered, it may be remembered, to save the life of a young sentry who had fallen asleep at the post of duty. Death by torture, such as burning at the stake and breaking on the wheel is no longer permitted by humane governments. Beheading and hanging are the usual methods. Electrocution, or death by a current of electricity, is instantaneous, and has been tried with success. It is prescribed by the laws of some states. Opinion in favor of executions removed from the public gaze is growing. The hour chosen is not infrequently midnight. In the United States the sentence of a court requires to be approved and the date of execution set by the governor.

Capitol, in American history, the official building at Washington occupied by Congress. A state capitol is occupied by a legislature and, ordinarily, by state officers. The term corresponds to Parliament House in England and the colonies. The capitol of Rome stood on the Capitoline Hill. It was the central temple in which Jupiter, Juno, and Minerva were worshiped.

The United States Capitol is situated on a low hill ninety-seven feet above the Potomac and one and one-third miles from the White House. The corner stone of the central building was laid by George Washington September 13, 1793. The building was partially destroyed by the British in 1814. The damage was repaired and the building completed by 1827. This portion consists of a rotunda and two short wings. It faces the east with a rear entrance on the west. The rotunda is an immense circular hall ninety-seven feet in diameter, springing from the floor to the vaulted ceiling of the dome overhead 180 feet in the clear. The outside height of the dome, including the statue of Freedom, is 307½ feet. The dome itself, the crowning glory of the city, is made of iron and weighs nearly 9,000,000 pounds. It is so constructed that it may contract and expand with change of temperature like the folding and unfolding of the petals of a lily. It may be ascended by a spiral stairway for a view of the city. In 1851-9, an extension, almost as large as the main building, was constructed on the south for the House and one to balance on the north for the Senate. They are connected with the main building by corridors. The old Senate chamber is occupied by the supreme court. Congress has directed an enlargement of the main building toward the east to provide more committee rooms. The central part of the building is of Virginia sandstone. The extensions are of Massachusetts marble; the columns of the grand portico are single stones of Maryland marble. The sandstone has been painted white to harmonize.

The historical paintings, statues of public men, bronze groups, corridors, and stairways are most instructive. The entire building, including the halls of Congress, except when actually in use, is open to visitors freely. Every effort is made to have the people feel that it is their own.

Capri, kä′prē, or **Goat Island,** an island in the Bay of Naples. Its area is about ten square miles. The inhabitants number between 4,000 and 5,000. They are occupied chiefly in fishing and in raising olives and grapes. Capri wine is famous. In the migrating season immense flocks of quails light to feed and rest.

They are taken in great numbers. Capri is noted chiefly for a number of remarkable grottoes or caves in the steep limestone coast. They are entered by boats. One is known as the blue grotto, another as the green, from the soft, delightful colors that prevail within.

Capsicum, an annual or biennial plant, having more or less woody stems, and a shrubby, bushy growth. Its native land is tropical America, where it is grown for its fruit, which is pungent and stimulating. It has inconspicuous flowers and simple leaves, and its fruit differs in shape, and is sometimes red, sometimes yellow. The dry berry contains many seeds of a whitish color, and these are more pungent than the fresh pulp. Cayenne pepper consists of the ground seeds and pods. The common capsicum, or chili pepper, is the species most commonly grown. The fruit is used either ripe or unripe, but the dried seeds and pods only are used in the making of Cayenne pepper. Capsicum, mixed with vaseline, is a well known ointment, which is very effective in colds.

Captain Cuttle, a character in Dickens' *Dombey and Son.* He is a retired sailor, "a very salt-looking man indeed." On his first appearance on the scene he is described as "a gentleman in a wide suit of blue, with a hook instead of a hand attached to his right wrist; very bushy black eyebrows, and a thick stick in his left hand covered all over (like his nose) with knobs." Captain Cuttle is an intimate friend of Sol Gills, the ship's instrument maker.

> The captain drew Walter into a corner, and with a great effort, that made his face very red, pulled up the silver watch, which was so big, and so tight in his pocket, that it came out like a bung.
>
> "Wal'r," said the captain, handing it over, and shaking him heartily by the hand, "a parting gift, my lad. Put it back half an hour every morning, and about another quarter towards the arternoon, and it 's a watch that 'll do you credit."

A favorite expression of Captain Cuttle's, frequently quoted, is, "when found make a note of."

Capua, a city of ancient Italy. It was situated in the Plain of Campania, seventeen miles north from Naples. It was founded by the Etruscans, came under Samnite rule about 423 B. C., and was taken over by the Romans in 340 B. C. Capua was second only to Rome in size and exceeded that city in wealth and luxury. Capua opened its gates to Hannibal, who wintered here 216-15 B. C. The Romans retook the city and punished the inhabitants for disloyalty. Capua was headquarters for gladiatorial sports. The remains of an amphitheater rival those of the Roman Colosseum. Capua was sacked by Genseric 456 A. D., and was destroyed by the Saracens in 840. The site is now occupied by a small Italian village. See CAMPANIA; GLADIATOR.

Capuchin, a branch of the monastic order of St. Francis. The order was a seceding body of men who desired to reform the Franciscans by a return to greater austerity of life. By a bull of Pope Clement VII, Capuchins obtained leave to wear a pointed hood or capuccio, from which comes the name Capuchins. "Consistently with the austerity of their professions, their churches were unadorned, and their convents built in the simplest style. They became very serviceable to the Church, and their fearlessness and assiduity in waiting upon the sick during the plague, which ravaged the whole of Italy, made them extremely popular." In the United States they have houses in New York, Milwaukee, and elsewhere.

Capulet, kăp′u-lĕt, the father of Juliet in Shakespeare's *Romeo and Juliet.* The name is the English spelling of Cappelletti, a noble family of northern Italy, according to the tradition of Verona. Shakespeare's Capulet, a self-willed, violent old man, is the head of the family and is at variance with the house of Montague, another noble Veronese family. See ROMEO AND JULIET.

Capybara, kä-pe-bä′rȧ, a water-loving animal found in the tropical regions of South America, especially in the waters of the Orinoco, the Amazon, and the La Plata. It is the largest rodent known. It belongs to the guinea-pig family. It is intermediate between the hare and the porcupine. It has a massive body covered

with brown hair, and bare legs terminating in feet shaped rather for swimming than for walking. It has the stumpy tail of a small rabbit, a broad, flat head, small ears, the eyes of a pig, a broad nose, and teeth shaped like those of a muskrat. The Dutch settlers call it a water hare and sometimes a water hog. It lives in the grass along edges of streams, and takes to the water on the slightest alarm. It is the natural food of the South American anaconda, or water constrictor. It is an inoffensive animal. It attains a weight of 100 pounds. Its flesh is considered good eating. Its teeth are suitable for cutting off grass and sugar-cane, on which it chiefly feeds. Its visits are dreaded by the planter. See GUINEA-PIG.

Car, a term applied to several vehicles, but most frequently to a wagon drawn or propelled by mechanical power on some sort of a track or railway. The use of cars preceded the invention of the locomotive. The first freight and passenger cars were coaches drawn by animal power. The car drawn by Stevenson's first locomotive was a small, comfortless, wooden-seated affair, made out of an ordinary coach, very different from the palace of wood, iron, glass, and upholstery now found on American railways. In fact, the first passenger cars used in this country were the bodies of four-horse coaches set in a wheel-bearing frame, and the earliest railway cars were built on much the same model. Some were open or without a top, and some were built with outside seats on the top as well as seats inside. About 1833 the long passenger car with entrances at the ends made its appearance. It was described in England as an American contrivance built rather on the model of a ship than on that of a coach.

The first sleeping car ran between Philadelphia and Baltimore in 1838. It accommodated twenty-four passengers. In 1858 two sleeping cars were built at a cost of $5,000 for the two, for the run between Buffalo and Cleveland, but were not a profitable venture. In 1863 the first regular Pullman was built at a cost of $18,000, then considered a prodigious venture of money. The platform vestibule was thought out in 1887. Postal cars date from 1860.

The passenger coaches of Europe are divided by cross partitions into entirely distinct compartments. Each compartment has two doors, one on each side of the car. To pass from one compartment to another it is necessary to alight from the car and walk along an outside footboard or the station platform. It is quite out of the question to pass through a train. Each compartment seats ten passengers, five facing forward and five backward.

The latest available statistics show that the various American railroads maintain 1,300 car shops for the repair and manufacture of cars, and give additional patronage to sixty-five car-building establishments. Over 200,000 people earn wages by building cars. Freight cars last about twelve or fifteen years.

On December 31, 1922, there were 2,344,787 freight-train cars in service on the Class I railroads of the United States, and including the equipment of the short-line railroads, a total of approximately 2,750,000. The types of freight cars include box, flat, stock, gondola, hopper, tank, refrigerator, caboose and other cars. In 1922 orders were placed by the Class I railroads for 173,858 freight-train cars of the various types. There are about 1,750 carshops maintained by the railroads, with 490,000 wage earners, and a total production in 1920 valued at $1,279,235,393; and 100 private car-building establishments, with 53,000 wage earners and a product valued at $583,084,545. Electric railway car shops, numbering 624, also turned out cars to the value of about $94,000,000, mostly passenger cars.

Passenger cars in service on the larger railroads in 1921 numbered 54,331, and orders were placed in 1922 for 2,403 additional, including coaches, combination passenger and express, or other combination cars, dining cars, parlor cars, and baggage or express cars hauled on passenger trains.

All-steel or steel underframe construction is now generally used for both freight and passenger cars. Capacity of box cars has been increased from 50 to 70 tons, and of coal cars to 120 tons in some cases.

In 1921 the United States exported 15,633 freight cars, valued at $25,930,000, and American-built cars are now in service in all parts of the world. See RAILROAD.

Caracas, kä-rä′käs, the capital city of Venezuela. Latitude 10° 32′ N.; longitude, 67° 4′ W. The city was founded by Spaniards in 1567. The name is derived from that of a tribe of Indians inhabiting the valley in which the city is situated. Caracas lies at an elevation of 3,000 feet. It is the official and residence city. La Guayra, a few miles distant, is the port where business is done. A railway connects Caracas with La Guayra and three radiate from Caracas into the interior for ores and agricultural productions and forest products. The city is well built. There are electric lights, gas, telephone service, street railways, business blocks and hotels, lending to the city a modern air. Population, 92,212.

Carat, kăr′ăt, a unit of weight for precious stones. The word is derived from the Arabic, having reference to the horn-shaped pod of a locust tree, whose dried beans were used as weights. By a conference of jewelers held at Amsterdam in 1877, the weight of a carat was fixed at 205 milligrams or 151.76 carats to the troy ounce. In estimating the fineness of precious metals a carat is a twenty-fourth part. A ring eighteen carats fine contains eighteen twenty-fourths of pure gold. The standard fineness of a wedding ring is twenty-two carats. A gold chain should not be over fourteen carats fine if wearing qualities are desired. Twenty-four carats fine is said to be "solid gold."

Caravaggio, Michel-Angelo Merisi or **Merisio, Da** (about 1565-1609), an eminent Italian painter, founder of the Naturalist school. The name he is known by, Caravaggio, is that of his birthplace, where his father was an architect. He spent some years in study, probably with Campi at Milan, at Venice, and later appeared in Rome. His talent developed rapidly, and he soon became very popular, although he was of a quarrelsome disposition and killed a man over a game. He was protected by his patrons, however, but had to leave Rome for this offense.

Among his works are the *Card Players,* the best example of which is at the Sciarra Palace, Rome; *Love as a Ruler and Love Conquered,* both in the Berlin Museum. Among his religious compositions are: *St. Matthew Writing the Gospel,* now in the Berlin Museum; the *Death of Mary,* in the Louvre; his masterpiece, the *Burial of Christ,* in the Vatican, and *Christ and the Apostles at Emmaus.* Many of Caravaggio's works are found in the galleries of Europe.

Caravan, a company of pilgrims or merchants associated for protection in traveling through the wastes of Asia and Africa. Before the discovery of the mariner's compass enabled sailors to venture out of sight of land, the commerce of the oriental countries was carried on overland by trains of laden camels. The cities of Asia Minor, of Syria, of the Tigris-Euphrates Valley, of Persia, and of Central Asia were built up by caravan traffic as railroads build up cities today. Ur of the Chaldees, Babylon, Nineveh, Cairo, Bagdad, and a hundred other cities of the ancient world were caravan centers of enormous business and wealth. Instead of railroad trains bringing and carrying goods long trains of camels from the East brought bales of rugs, carpets, shawls, tea, spices, perfumery, and gems from Persia, China, and India, and returned laden with western products brought by similar caravans to these centers of distribution.

Caravans are still the chief means of collecting and distributing goods in the northern part of Africa and in many parts of Asia; but the immense caravan business between central and western Asia has been broken up by railroads and steamers. At present the chief commercial caravan routes radiate from the seaports along the southern shore of the Mediterranean. Three notable caravans meet annually at a religious fair at Mecca. The Persians gathering at Bagdad, the Arabs of the Sahara, at Cairo, and the Arabians, at Damascus, come together at Mecca to sell and buy and to visit the tomb of Mahomet.

See ADEN; MECCA; CAMEL; TIMBUCTOO.

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See ADEN; MECCA; CAMEL; TIMBUCTOO.

Carbohydrates, the name of certain chemical compounds found in large quantities in the animal and vegetable world. They are formed of carbon, hydrogen and oxygen. Carbohydrates are among the most necessary substances of our food, and are contained in starch, cellulose, and various kinds of sugar, granulated sugar being a pure carbohydrate. All vegetable foods are rich in carbohydrates. Carbohydrates, however, are not alone sufficient for the body's nourishment, since they cannot be converted into muscle. See PROTEIN.

Carbolic Acid, a well known compound of carbon, hydrogen, and oxygen. In the pure state, it takes the form of white crystalline needles. Ordinarily it is a liquid somewhat heavier than water, and having a slightly acid taste. It is obtained in the distillation of coal tar. Carbolic acid has many uses. It kills bacteria. Surgeons use a weak solution to sterilize their instruments and as an antiseptic dressing for wounds. Under medical advice it may be taken in minute quantities as a remedy.

Carbon, one of the important chemical elements. Pure carbon occurs in two widely different forms, the diamond and graphite or plumbago. Charcoal, soft coal, and hard coal are largely carbon. The purer the carbon, the better the quality of the coal. Under ordinary circumstances carbon is an inactive element. A piece of charcoal, or graphite, or a diamond will lie for ages in ordinary water unchanged. They are without taste or odor and cannot be melted; yet under favorable conditions carbon is distinguished for the number of chemical combinations into which it enters.

Carbon is the great fuel. Under the influence of heat it burns; that is, it unites with oxygen and disappears in a gas. In coal, kerosene, gas, oil, fat, lard, tallow, suet, blubber, wood, or any form of fuel whatever, carbon is the element which burns and, uniting with oxygen, gives heat and light.

Carbon is an important and indispensable part of animal and plant life. Any substance that chars with heat contains carbon. Charcoal is merely the carbon of wood left behind when the volatile parts of the wood are evaporated by heat. A black char of carbon may be obtained from any flesh or vegetable substance by driving off the other substances by heating.

Black as carbon is, it is an important part of all the grains. Green grass, hay, sugar, starch, alcohol, limestone, marble, and chalk contain carbon. It is present in tea, coffee, bread, wine, vinegar, milk, and in almost every article, especially fatty articles of food. A trace is present in all spring water, and mineral waters of note contain considerable quantities of carbon.

Carbonari, kär-bō-nä′ri, a secret revolutionary society in Italy. It was formed in the days of Napoleon to drive out the French. It was prolonged to expel the Austrians and to unite Italy. The name signifies charcoal burners. Their places of meeting were called huts; Italy, the forest; and their enemies, the wolves. They were known to each other as good cousins. They had no central organization. Their number, therefore, is not known, but is estimated at half a million in 1820-1. They imitated many observances of the Masons. The order was succeeded by Young Italy, founded by Mazzini.

Carbon Dioxide, or **Carbonic Acid Gas,** a well known compound containing one atom of carbon and two of oxygen. It is colorless. It exists in small quantities in atmospheric air, from three to four parts in every ten thousand being carbon dioxide. It escapes from many mineral springs, and is found at the bottom of mines and in caves. It is formed also by the imperfect burning of fuel, by the breathing of animals, by fermentation, and by the decay of animal and vegetable matter. Like other animals, people emit carbon dioxide in breathing. Carbon dioxide is incombustible. It will put out the flame of a lighted candle, gas jet, or even a piece of burning phosphorus, when these are placed in a jar filled with the gas. It is not poisonous, but it does not support animal life. Carbon dioxide in the air prevents the lungs from obtaining needed oxygen. A person dies in air con-

taining an excess of carbon dioxide just as he dies in water, not by reason of poisonous qualities belonging to the carbon dioxide or to the water, but because air is shut out of the lungs. For this reason dwelling houses, especially sleeping rooms, should be ventilated thoroughly. Being heavier than air the carbonic gas settles to the floor. In Paris the city poundmaster incloses stray dogs, thirty at a time, in an iron lethal chamber and drives in carbonic acid gas. In forty seconds death ensues from suffocation—want of air.

In volcanic regions where the crust of the earth is thin in places, carbon dioxide sometimes issues so abundantly as to form white, cloud-like masses above the fissures. In the region of Vesuvius, there are several such thin-crusted places. One is the crater of the extinct volcano, Solfatara; another is the so-called Grotta del Cane, or Cave of Dogs, near Naples. This cave receives its name from the fact that if dogs were thrown into it, or witlessly entered it, death followed in a few seconds. The Romans of Caesar's time used to throw in slaves whom they wished to kill or other helpless creatures from whom they desired to free themselves. This cave, the Grotta del Cane, can be seen today in the same condition in which it existed during the time of the Roman Empire. The Upas Valley in Java, about three-fourths of a mile long, is another region in which carbon dioxide is fatal to animal life. No animal can live here. It is said that the valley is strewn with the bones of animals which have been suffocated by the fumes and with the remains of birds that have perished while flying over it.

While it is true that air is unfit to breathe if it contains an excess of carbon dioxide the reader should get away from the idea that it is a poison. In fact, the gas, like water, is one of the beneficent provisions of nature. It is present in small quantities in the atmosphere. Taken in through the breathing pores, the stomata of plants, it forms a large part of the tissues of the vegetable world. The starch of rice, wheat, corn, potatoes, and bananas, in short, of all starchy food plants, is built up out of carbon dioxide and water. The gas is inhaled with air by the leaves; the water is imbibed by the roots. Sugar-cane, the sugar beet, and all the fruits, build up their sweets from the same two materials obtained likewise by leaf and root. Fats are built up of starches or sugars, and are likewise composed of carbon dioxide and water. The farmer who sells fat hogs, fat steers, butter, cheese, sugar beets, sugar-cane, fine flour, and potatoes is marketing little but water and a gas, millions and billions of pounds of which are dissolved in the atmosphere.

Carbon dioxide is in the way in the lungs and it is cast out by the blood, yet it is, as we have seen, an important constituent of foods. While carbon dioxide is out of place when inhaled, it can be taken into the stomach and is then refreshing.

Under pressure of 450 pounds to the square inch at 5° below zero F., carbon dioxide changes to a liquid and it is stored in this form in steel bottles for use in soda fountains and for various other purposes.

Carbondisulphide, a compound of carbon (coke or charcoal) and sulphur, which, when heated together, vaporize and are then condensed, forming a colorless heavy liquid. The two elements are usually heated in an electric furnace. Pure carbondisulphide has a rather pleasant smell, but the commercial article is commonly malodorous. It is frequently employed in the extermination of moths, moles, rats, mice and prairie dogs, and is used in the manufacture of artificial silk from wood pulp.

Carborundum, the trade name of a compound of silicon and carbon. It is produced by fusing sand and carbon. The process was hit upon about 1890. Two electric furnaces at Niagara Falls are the chief source of the commercial supply. Large quantities are made yearly. Carborundum has superior qualities as glazing for fireproof brick used in furnace buildings. Furnace linings may be protected by a paste of finely ground carborundum applied with a brush. It is

used chiefly as a substitute for corundum and emery in the manufacture of "emery" wheels for grinding tools. See CORUNDUM; EMERY.

Carboy. See BOTTLE; DEMIJOHN.

Carburetor, a device used in an internal combustion engine, such as the automobile motor, to transform the liquid fuel, generally gasoline or other light hydrocarbon, into a gas, and at the same time mix it with such a proportion of air as will make it explosive by the electric spark. The spray or float-feed type of carburetor is now almost universally used. Its action is similar to that of the atomizers which are in common household use.

Cardiff, an important town of Wales, the county town of Glamorganshire. It is situated at the mouth of the Taff, on the estuary of the Severn. It is an important town commercially, and is the principal outlet for the mineral produce and manufactures of South Wales. It is one of the important ports of the United Kingdom. Cardiff is a very old town, and existed before the Roman Conquest of Great Britain, and as early as 1066 was a place of considerable importance. Population, 204,436.

Cardinal Bird, or Cardinal Grosbeak, a member of the sparrow or finch family. The cardinal is a lordly, clumsy, rose-red fellow with a large crest and a black throat. The female is olive brown. The cardinal breeds from Minnesota to the Gulf and eastward, nesting in bushes and making itself useful by eating grubs and worms. Both sexes sing well, and are favorite cage birds. Mrs. Olive Thorne Miller has written entertainingly of the cardinal.

One's first impression of the cardinal grosbeak will usually be that he is rather a clumsy fellow. His body appears to be stiff, as if it were made of wood, different in every way from the pliant, lithe body of the catbird, for example. He hops about on the ground with tail held well up out of harm's way, and comes heavily down upon his feet, as if his body were really very solid. In fact, he is not at all a graceful bird. . . .

As the head of a family, the cardinal is admirable, not only in his attentions to his lovely dove-colored mate, but in singing to her by the hour, and in protecting her from intrusion or danger. To the young in the nest he is an untiring provider of worms and grubs, and thus most useful in a garden. Nothing can be more comical than his behavior when he first conducts his young family out into the world while his mate is engaged with her second sitting. He is as fussy as any young mother, hopping about in great excitement, and appearing to think the whole world thirsting for the life of his pretty little ones.

The cardinal mother shows the restless manners and anxious spirit of her mate, taking one's intrusion upon her domestic affairs greatly to heart, and being so much disturbed that there is more pain than pleasure in making acquaintance with her nestlings.

See GROSBEAK.

Cardinals, next to the pope, the highest dignitaries in the Roman Catholic church. The college of cardinals, charged with the duty of electing the pope, consists of seventy members, though the college is seldom, if ever, full. The pope fills vacancies by appointment. Scarlet is the distinguishing color of the cardinal. The pope signifies an appointment by sending a messenger to place an official scarlet hat on the head of the bishop or archbishop whom he wishes to honor; hence the expression "to send a red hat," or, "to receive a red hat." Other articles of a cardinal's attire are a red cap, a purple cassock, a sapphire ring, and a mitre of white silk. Archbishop McClosky became the first American cardinal 1875.

The Official Catholic Directory for 1922 gives two cardinals for the United States: William H. O'Connell, Boston, Mass.; and Denis Cardinal Dougherty, Philadelphia, Pa. See PAPACY.

Carding and Combing, in the manufacture of textiles, processes employed to prepare raw cotton, wool, silk, etc., for spinning. The terms are often used synonymously, and the two processes are closely related, combing being a continuation of the carding principle. Carding opens up or loosens the raw material, pulling fiber from fiber, tearing apart any that are matted and leaving the mass loose, free, and soft. Combing extracts from this mass short and broken fibers, and lays the long fibers in a parallel position. Both processes help to free the fiber from small foreign litter, broken leaves, stems, sand, etc. It is evident that material of very short fiber, like American cotton, the fibers of which are less than an inch in length, cannot be combed success-

fully, but that the process of combing, when it can be employed, produces a smoother and stronger yarn than that made by carding alone. A description of the implements used formerly in hand carding and combing may serve to make clear the distinction in the two processes.

The hand method of carding is still used by housewives to prepare small quantities of wool for domestic purposes, or to renovate wool which has become matted by use. Two "cards" are used. These are simply oblong pieces of wood set with short iron teeth, as a brush is set with bristles, and furnished with handles. One card is held in the left hand with teeth uppermost. A quantity of cleaned and scoured wool is placed on this card. The other card, held in the right hand, is drawn over the wool gently. This process is repeated over and over until the mass is torn up and blended and distributed evenly over the cards. The wool is then lifted from the card and is shaped gently in the hands into a loose roll ready for spinning.

In combing by hand two "combs" are used. These are strips of wood furnished with handles and set with two rows of long steel teeth or spikes. The workman attaches one of his combs, teeth outward, to a comb-post. He then seizes a handful of the wool, which is warmed and oiled, and draws it through the comb, leaving a portion caught in the teeth. In this way he fills both combs with fiber. Then, holding one comb in his left hand, he takes the other in his right, and combs out the entangled fibers, first those near the tips of the teeth, gradually working deeper and deeper into the mass. At the last the teeth are worked close up to each other. If one possesses the skill and "knack" for this work, the result is the extraction of short fibers and the laying of longer ones in a comparatively parallel position. Machinery is now in use to perform both processes of carding and combing.

Wool is always carded. It is combed only when it is to be spun into "worsted" yarns. In this process the laying of the fiber in a parallel position is called frequently "gilling," the word "combing" having reference to the removal of short fibers. The machine employed is intricate and delicate. Formerly cotton was spun without either carding or combing. At present it is carded usually, but for ordinary purposes a sufficiently good quality of yarn is produced without the additional process of combing.

Three distinct operations are included under carding. Opening, that is, loosening up the masses of fiber and removing heavy impurities; scutching, which still further cleanses the fiber and spreads it into a wide "lap"; and carding proper, which continues the opening process until the fibers are separated one from the other, removes many short, unripe, and broken fibers, together with fine sand and other foreign particles, and finally reduces the lap or sheet to a loose, soft, continuous rope, called a "sliver." This is regarded as one of the most beautiful processes that can be seen in a mill or factory. One yard of the "lap" from the scutcher weighs about one hundred times as much as does the "sliver" into which it is made in the carding machine. Some idea of the cotton carding machine may be had from the statement that a cylinder of this machine, forty inches wide and fifty inches in diameter, bears over 3,000,000 teeth.

For sewing and machine thread, fine hosiery, lace curtains, imitation silks, and certain fine cotton fabrics, the combing of the fiber is considered essential. Sea-island and brown Egyptian cotton are classed as long-stapled, because the fiber is sufficiently long to admit of combing. No machine in cotton spinning adds one-half as much to the expense of producing the yarns as does the comber. One reason for this is the fact that the comber makes about seventeen per cent of waste, which is as much as the combined waste of all the other machines in the mill.

In the manufacture of silk textiles, the "reel" silk needs no carding or combing. The "spun" or waste silk is carded and combed by processes resembling those used in carding cotton. In preparing flax for spinning, the process which cor-

responds with carding and combing is called hackling.

Cards, oblong bits of pasteboard used in playing various games. A pack of ordinary playing cards consists of four suits of thirteen cards each, or fifty-two cards in all. The suits are marked with hearts, diamonds, clubs, and spades respectively. Each suit contains a king, queen, knave, and ten cards ranging from a ten spot down to a one spot known as an ace. The cards rank in the order named, though in some games exceptions are made. In whist, for instance, ace is the highest. In euchre the knaves or jacks, as they are also called, outrank. In most games a particular suit is called trumps, in which case any card of that suit outranks even a king or an ace of any other suit In many games a fifty-third card, call d a joker, is added. The joker is always a trump and is the highest card in the pack.

Cards are thought to be of eastern origin. They made their way westward along the lines of caravan travel, and may have been introduced into Europe by the Saracens. The modern figures on cards are said to have been invented in France fifty years before the discovery of America. The four suits stood for four ranks in society. Hearts is an English corruption of a French word meaning choirmen or clergy; spades is likewise a corruption of a Spanish word signifying the sword. They represent the soldiers; clubs, the clover leaf, is the suit of the peasantry; and diamonds represent the square tiles or caps of the merchants. These names are by no means universal. The suits in an Italian and Spanish deck of cards were known as cups, swords, money, and clubs. The German suits were hearts, leaves, bells, and acorns. The Hindus played with geese, birds, camels, and horses.

Some games of cards, as poker and hearts, may be played by a circle. The different games of whist are played by four persons. Two may play at cribbage, penuchle, and bezique. Solitaire, in all its forms, is a game to be played alone.

See GAMES.

Carex. See SEDGE.

Caribbean Sea, an arm of the Atlantic, lying between the West Indies and the coasts of Central and South America. The Caribbean is larger than the Gulf of Mexico. Its basin comprises 750,000 square miles—one-fourth as large as the United States. The basin is a huge mountain cup. The coasts are not continuous, but they are everywhere mountainous. The water varies in depth from shallows to abysses. The floor of the sea is uneven. Bartlett Trough is described as a chasm a few miles wide but hundreds of miles in length and three miles deep. An equatorial current enters the Caribbean Sea through the passages of the Windward Islands and, continuing westward, sweeps through Yucatan Channel into the Gulf of Mexico. The trade winds bring tropical moisture that falls—literally falls—in sheets that the inhabitants of more temperate climes know not of. Destructive tempests are not infrequent. The temperature is "modified by the trade winds," but to the northern traveler the navigation of the Caribbean is associated with much torrid discomfort. The name is derived from the Caribs, an Indian family yet dwelling in places on the coasts and islands of this great sea.

Caribou, kăr′ĭ-bo͞o, an American reindeer ranging from Maine to Lake Superior and northward. With the exception of the musk-ox, it ranges farther north than any other hoofed animal. There are two groups or species, the woodland and the barren ground caribou. The latter ranges further to the north, beyond the limit of timber, but retires southward in herds of thousands in the winter time. The woodland caribou is of a dun gray color and is about three and one-half feet high at the shoulder. Its fleetness reminds one of the antelope. It lives mainly on lichens. The antlers are flattened somewhat like those of a moose. Its numbers have been greatly diminished by persistent and merciless hunting. An interesting account of a caribou school as well as other sketches of caribou life, are given by William J. Long in his *Wilderness Ways*. See REINDEER.

Caricature, an absurd or laughable exaggeration. To be successful, caricature must be founded on fact. A person with a short chin may be represented with an absurdly short chin; one with a long chin with an absurdly long chin. The Japs may be represented as midgets because they are not large, but it would not be caricature to represent them as giants in stature. Successful caricature must lean in the same direction as the facts. Caricature may be drawn with a pen or a pencil. In *Hudibras,* Butler caricatures the Puritan. Cervantes' *Don Quixote* is a caricature of the knight and his squire. The writings of Steele and Addison in the *Spectator* are full of caricature. Hogarth caricatured London vices of the eighteenth century in several series of pictures. The London *Punch* caricatured President Lincoln. Thomas Nast and *Harper's Weekly* literally goaded Boss Tweed to his death. The picture of Tweed in prison stripes with a ball and chain on his leg is fixed in the history of New York. Comic pictures are usually caricatures. They are becoming more and more a feature of the newspaper. An editorial may be unread for want of time, but a picture of a notoriously corrupt city council with masks, dark lanterns, and burglar's jimmies, engaged in prying open the public treasury, is taken in at a glance and fastens itself upon the retina of the mind as well. The coarse work of cheap St. Valentine prints has no place in art. Effective caricature requires talent and study. See NAST; PUNCH; THACKERAY; TWEED; HOGARTH.

Carleton, Will (1845-1912), an American poet. He was born at Hudson, Michigan, and educated at Hillsdale College. He made his home for some years in Brooklyn, New York. He wrote several volumes of verse. The best known are *Farm Ballads, Farm Legends, Farm Festivals, City Ballads, City Legends,* and *City Festivals.* Mr. Carleton was very successful as a lecturer and reader of his own ballads. Among his most popular poems are *Betsy and I are Out, Over the Hill to the Poor House, The First Settler's Story, The Chicago Fire,* and *The Christmas Baby.* Carleton was a poet of the home. He presents the humorous and tragic incidents of farm and country life in the form of dramatic monologue. His characters are honest, brave, and kindly. Their homely speech seems a fitting vehicle for the expression of deep but simple feeling. In *The New Church Organ* the good sister tells how she dislikes the "new machine," and disapproves of "praising the Lord by note":

"I've been a sister, good an' true,
For five-an'-thirty year;
I've done what seemed my part to do,
And prayed my duty clear;
But Death will stop my voice, I know,
For he is on my track;
And some day I to church will go,
And never more come back;
And when the folks gets up to sing—
Whene'er that time shall be—
I do not want no patent thing
A-squealin' over me!"

Carleton, Sir Guy (1724-1808), a British general and colonial governor. He was born in Ireland and entered the army at an early age. He saw active service under Amherst at Louisbourg in 1758, under Wolfe at Quebec the following year, and in the British attack in Havana in 1762. He became lieutenant governor of Quebec in 1766 and for the following 40 years was active in Canadian affairs. At the outbreak of the Revolution, he was commander of the British army in Canada, and defeated the attempts of the Americans to force Canada to join with them. He invaded New York in 1776, but was superseded in command the following year by General Burgoyne. In 1782 he again became the commander-in-chief of the British army in North America. He later became governor of Quebec, and was rewarded for his services in saving British North America to England by being created Baron Dorchester.

Carleton's fame rests not only on his military services, but also his ability in a governmental capacity. His position as an English governor over the recently conquered French was a delicate one. Though his rule was stern, it was humane and just. He is said to have inspired the Quebec Act of 1774 and helped frame the Act of 1791 by which Canada became two provinces.

Carleton, William (1798-1869), an Irish novelist. He was born in County Tyrone of humble parentage, with but such education as a hedge school and a brief term or two at an academy could afford. He went to Dublin, took up writing and there in 1830 published his first series of *Traits and Stories of the Irish Peasantry.*

The vein of Irish stories opened up by this writer is a delightful and pathetic one. Hedge schools, crop failures, shanty life, bog trotting, secret whiskey stills, wedding feasts, dances, races, deaths, wakes, fairs, boycotts, murder trials, and rescues are told with a keen zest worthy of comparison with Burns's *Tam o' Shanter,* Goldsmith's *Vicar of Wakefield,* and Irving's *Legend of Sleepy Hollow.* Carleton's other writings are *Fardarougha the Miser,* by many considered his best; *Valentine M'Clutchy; The Misfortunes of Barney Branigan;* and *Willie Reilly.* For several years before his death Carleton received a pension of $1,000 a year.

Carlisle, capital of Cumberlandshire, England, situated at the junction of three streams. Carlisle was an important Roman outpost. The Solway end of Hadrian's wall is near here. The Danes sacked the town in 875. Mary, Queen of Scots, was imprisoned here in 1568; the castle is still standing. The most noted building is a cathedral begun by William Rufus. The Norman nave has been destroyed. The choir, a beautiful building in itself, still stands. It is noted for a handsome stained glass window, fifty by thirty feet. There are important manufactures of gingham and other cotton goods. Population, about 45,000.

Carlisle, kär-līl′, **John Griffin** (1835-1910), an American statesman. He was born in Kentucky, and was educated for the practice of law. He was sent to the legislature and from 1871 to 1875 was lieutenant governor of his state. In 1877 he was elected to Congress. He served for seven terms, being speaker of the House from 1883 to 1889. In 1890 he was elected senator. In 1893 he was secretary of the treasury under President Cleveland, in which office he is remembered as having advocated the gold standard, and as having been connected with the sale of bonds to replenish the treasury's gold reserve. At the close of Cleveland's term of office, Carlisle took up the practice of law in New York.

Carlisle, Pa., county seat of Cumberland County, on the Cumberland Valley, and the Gettysburg & Harrisburg railroads, 18 miles west of Harrisburg. It is the center of the farming and manufacturing industries of Cumberland County. Mount Holly Springs, a summer resort, is situated in the mountains in the vicinity.

It is the seat of Dickinson College. There are many important industrial plants in the town, these including boot and shoe factories, machine shops, factories for railway frogs and switches, paper-boxes, hosiery, carpets and ribbons. There are several banks, churches, hospitals, and many fine public buildings.

Carlisle became a town in 1751 and was incorporated as a borough in 1872. It was the headquarters of Washington during the Whisky Rebellion in 1794.

Carlists, in history, the supporters of the pretension of Carlos, a brother of Ferdinand VII, to the Spanish throne. They were and are yet the Absolutists of Spain. In religion and politics a comparison may be drawn between Carlos and the Carlists of Spain and the Pretender and the Jacobites of Great Britain. See CASTELAR.

Carlovitz, or **Karlowitz, Peace of,** a peace concluded January 26, 1699, between Austria, Poland, Venice, Russia, and Turkey, with the good offices of England and the Netherlands. Austria received large accessions of territory in Transylvania and Hungary; Russia gained Azov on the Black Sea.

The treaty of Carlovitz is memorable, not only on account of the magnitude of the territorial change which it ratified; not only because it marks the period when men ceased to dread the Ottoman Empire as an aggressive power; but, also, because it was then that the Porte and Russia took part, for the first time, in a general European Congress; and because, by admitting to that Congress the representatives of England and Holland, neither of which states was a party to the war, both the Sultan and the Czar thus admitted the principle of intervention of the European powers, one with another, for

the sake of the general good.—Creasy, *History of the Ottoman Turks.*

Carlsbad, kärls'bäd (Charles's Bath), a city of Bohemia built up around the celebrated hot springs of that name. The name was given in honor of Emperor Charles IV, who is said to have discovered the value of their waters a hundred years before the birth of Columbus. The waters of the springs are charged with salts, and are of remarkable virtue in curing rheumatism, gout, and kindred ailments. The water is drunk on the spot. It is bottled also and sold throughout Europe and America. Carlsbad is a well built city of 15,000 inhabitants, with hotels, hospitals, theaters, opera houses, concert gardens, and every other convenience or luxury that wealth can supply. It has long been a brilliant social center. Archduke Ferdinand, George III, Augustus I of Poland, Peter the Great, Leibnitz, Maria Theresa, Goethe, Schiller, Beethoven, Wellington, Bismarck, and thousands of other celebrated persons, together with the aristocracy of Europe, have visited Carlsbad to regain their health or for social pleasures. About 25,000 summer visitors frequent the springs. The largest, the Sprudel, gushes up to a height of about three feet above the ground. The flow of the various springs is estimated at about 2,000,000 gallons daily. There are over fifty lace factories in the neighborhood.

Carlsruhe, kärls'rōō. See BADEN.

Carlyle, kär-līl', **Thomas** (1795-1881), an eminent man of letters. He was born in Ecclefechan, Dumfriesshire, Scotland. His father was a stone mason, known for intelligence and sterling worth. Carlyle himself says, "No man of my day or hardly any man can have had better parents." Young Thomas was so apt at his books that he could not remember the time when he was unable to read. He attended a nearby academy, taught school, and set out on foot for the University of Edinburgh. With the aid of oatmeal and cheese from home he boarded himself. He was an earnest student and a prodigious reader, learning more, he afterward claimed, from the university library than from his regular studies. "Nay, from the chaos of that library," says he, "I succeeded in fishing up more books than had been known to the keeper thereof." He studied theology, taught, and studied law, but could not tell which he hated worst. He became a tutor to two wealthy boys, and earned quite a sum of money with which he made himself comfortable, and assisted the folks at home.

Carlyle's likings were for literary work. In 1818 he settled down at Edinburgh and began writing articles for the various reviews. Here he married Jane Welsh, a superior woman, who had become interested in his literary struggles. After residing for a short time in Edinburgh, they removed to a small estate belonging to Mrs. Carlyle, known as Craigenputtock, or the Crag of the Hawks. Here Emerson visited him. Two men more unlike could not be found. Their friendship, however, continued through life.

Among other pieces of work, Carlyle here wrote his famous *Essay on Burns.* He was familiar with his subject and wrote in a sympathetic vein. It is not only his best essay, but the most suitable of his writings for young people. In 1834 he moved to London and settled in a suburb called Chelsea, where Mrs. Carlyle became noted for little receptions given to literary people. Carlyle was known as the "Sage of Chelsea."

Carlyle was a crabbed, bitter, dyspeptic man, of inflexible integrity, and unsparing in his criticisms. His works are hard to read, but are full of good thought. He was an earnest advocate of duty, hard work, and economy. Like Ruskin and other eminent British thinkers, he lacked faith in the ability of the common people to regulate affairs of state. He preached the doctrine that the leaders of society and government ought to be persons of great nobility of character, and of unselfishness, in whose ability and management the people should place implicit confidence. His *Heroes and Hero Worship,* a series of short lives of great men, gives his ideas on this subject. Another noted work is *Sartor Resartus,* or *The Tailor Resewed.* It is an account of his own

early mental experience. His essays cover a wide range of German, English, and French subjects. A number are grouped under the title of *Past and Present.* Quite in line with *Heroes and Hero Worship* is the *Life of Frederick the Great* in twelve volumes, and *Oliver Cromwell's Letters and Speeches.* A *History of the French Revolution* is one of the most vivid pieces of writing in existence.

In 1866 Carlyle was appointed lord rector of Edinburgh University, a purely honorary position, not requiring residence. He went down to Edinburgh and delivered a noble inaugural address full of power, but was prostrated in the flush of new honors by the intelligence that Mrs. Carlyle had passed away. During their lives she had been a most faithful, tactful, and, we may say, brilliant companion, who smoothed away much of his roughness, and to whom he owed no small degree of his success.

Though dyspeptic, and with a tongue that rasped like a file, Carlyle was after all tender-hearted. He spent the rest of his life in the vain regret that he had not been better to his wife while he had her. At death, in 1881, his remains were conveyed at his request to his native village of Ecclefechan.

Carlyle is not an author easily read, or easily understood. Aside from his *Essay on Burns* and *Essay on Johnson,* he is scarcely to be read at all by young people; but he is fairly entitled to the name of "The censor of the age." Few men, if any, have had greater influence on the thought of a century than he.

SAYINGS.

A dandy is a clothes-wearing man.
Silence is as deep as eternity.
Speech is as shallow as time.
Literature is the thought of thinking souls.
The greatest of faults is to be conscious of none.
One life,—a little gleam of time between two eternities.
For one man who can stand prosperity, there are one hundred that will stand adversity.
No mortal has a right to wag his tongue, much less to wag his pen, without saying something.
Genius is an immense capacity for taking trouble.
Always there is a black spot in our sunshine; it is the shadow of ourselves.
Do the duty that lies nearest thee! Thy second duty will already have become clearer.
Find out your task; stand to it: the night cometh when no man can work.

SAID OF CARLYLE:

No literary man of the nineteenth century is likely to stand out more distinct, both for flaws and genius, to the centuries which will follow. —R. H. Hutton.

Carlyle's literary style has been loudly and justly condemned. It is usually jagged and intricate, a mixture of terse English vocabulary with involved German structure of sentence. At first it seems like the belching of a volcanic mind; but after careful scrutiny it is found to be the studied expression of a mighty rhetorician who seeks not grace, but vividness; not elegance, but power.—Thomas B. Shaw.

No writer left a deeper impress on the Victorian Age.—F. V. N. Painter.

Carman, William Bliss (1861-), a Canadian poet. He was born at Fredericton, New Brunswick. His education was received at the universities of Edinburgh and Harvard. He studied both law and civil engineering. In 1886 he returned to Harvard and studied philology and English literature. He has done journalistic work on New York and Boston papers and as editor of *The Literary World.* He is the author of many poems. The best known volumes are probably the series entitled *Songs from Vagabondia, More Songs from Vagabondia,* and *Last Songs from Vagabondia.* These were produced conjointly with Richard Hovey. *Low Tide on Grand Pré, A Sea Mark, Ballads of Lost Haven, Behind the Arras,* and *A Winter Holiday* are other volumes by Carman. He is also the author of many delightful prose essays, descriptive of the homes and haunts of birds and wild game.

Over the shoulders and slopes of the dune
I saw the white daisies go down to the sea,
A host in the sunshine, a snowdrift in June,
The people God sends us to set our hearts free.

Carmel, a long range of low mountains in northern Palestine terminating at the Mediterranean in the promontory of Mount Carmel. The brook Kishon follows the northern foot to the sea. The Plain of Sharon is on the south, the Plain of Acre on the north. This is the region in which the prophet Elijah took refuge

and was fed by the ravens. Mt. Gilboa is near the eastern extremity. Mount Carmel, overlooking the Bay of Acre, was early a resort of hermits. The Carmelites, a Roman Catholic order of mendicant monks, took their rise here. See PALESTINE.

Carmen Sylva (1843-1916), the pseudonym of Elizabeth, Queen of Roumania. She was a writer of some note.

Carnac, a village on the southwestern coast of ancient Brittany. It is in the modern department of Morbihan, France. It may be reached by rail. Population, about 3,000. Carnac is famous for prehistoric remains. It was a seat of the Druids. Over 1,100 rude blocks of granite, some of them upwards of eighteen feet in height, stand on a level heath. They are arranged in rows and form avenues with a half circle at one end. The stones are thought to mark a vast Druidical open air temple and burying ground, but how people without modern tools could quarry and transport these huge stones is a marvel. The stones have the form of rough obelisks standing on the pointed end. Many of these stones were used at an early day by the surrounding farmers in the construction of stables and houses, so that the rows are far from complete. See STONEHENGE.

Carnation, a fragrant flower belonging to the pink family. Native to southern Europe. It has been cultivated more than 2,000 years. The Greeks called it dianthus or the divine flower. The name carnation refers to its original flesh color, which, under modern skill, has been broken up into white, pink, red, and every intermediate hue. Over 500 varieties are recognized by florists. Monthly carnations, plants that yield a perpetual supply of flowers for florists' purposes, were originated by a gardener of Lyons, France, about the middle of the nineteenth century. Carnations are propagated usually by cuttings. Millions of dollars are invested in hothouses and grounds devoted to raising carnations for the market. See FLORICULTURE.

Carnegie, kär'ne-gi, **Andrew,** a Scottish-American manufacturer and philanthropist. He was born at Dunfermline, Scotland, November 25, 1837. His father, a weaver in a small way, was driven out of business by steam competition in 1848 and emigrated to Alleghany City, Pennsylvania. Young Andrew entered business as a bobbin boy at twenty cents a day. Soon afterward he became a telegraph messenger boy and then a telegraph operator. His superior skill brought him to the notice of Colonel Scott, superintendent of the Pennsylvania Railway, who made him superintendent of a railway division. Mr. Carnegie laid the foundation of his fortune by borrowing money and investing it wisely in a sleeping car system. Money made in this way he again invested in oil lands, which yielded him a handsome profit.

At the outbreak of the Civil War, Colonel Scott, his old chief, became assistant secretary of war. He placed Carnegie in charge of the eastern division of military railroads and telegraph lines, a position which it is needless to say the latter filled with ability and integrity. When it became evident that wooden bridges for highways and railroads were to be replaced very generally by iron ones, Carnegie embarked in the business of building iron bridge work. From the first he saw the desirability of owning and controlling iron mines and coal mines, as well as machine shops. One step led to another naturally. By 1899 the Carnegie Steel Company controlled the iron and steel industry of Pennsylvania. In 1901 he retired from active business, exchanging his iron interests for $500,000,000 worth of United States Steel Corporation securities.

"Mr. Carnegie's withdrawal from active business was signalized by a tremendous 'stock-watering' operation. As a result, all people who use any form of iron-plate, tin or steel, have ever since been obliged to pay unduly high prices in order that the Steel Corporation may keep up dividends on this extra stock. At the same time, it is fair to say that Mr. Carnegie never followed the example of many accumulators of great wealth in defying the law and corrupting legislatures and judges."

After a busy, and, we may say, strenuous life, Carnegie found himself at liberty to carry out his own personal inclinations. He built himself a magnificent home, known as Skibo Castle, in Scotland. His winter residence was in New York. Mr. Carnegie kept open house at Skibo Castle. Many noted men visited him. Tobacco was one of his antipathies.

Carnegie was the first multi-millionaire to feel the moral obligation of the ownership of great wealth. He felt that millions acquired by employment of men as good or better than himself were not all his. His fortune was approximately $600,000,000, of which he gave away—or perhaps we might say in lieu of the above—transferred to others, $350,000,000 before his death. He left a wife and daughter to inherit the balance. The statement that it is "a disgrace to die rich" is attributed to Carnegie. That he did not succeed in avoiding such calamity is probably due to the difficulty of wisely disposing of such enormous wealth. It is not probable that the future will allow of any such aggregation of capital owing to industrial opposition and distrust. Carnegie was a "driver" and he practised in the earlier part of his career quite the contrary of methods advocated in his speeches and his books. Had he felt a proper care for the welfare of his men, at least in the earlier part of his life, the Homestead strike in 1892—a blot upon his memory—might have been avoided.

The Carnegie library plan is well-known. The community furnishes the site and maintenance; the Carnegie fund supplies the building. Gifts have been bestowed from Canada to Tasmania, costing from $5,000 to $1,000,000.

On August 11, 1919, the "Laird of Skibo" passed away. He rests in the old cemetery at Sleepy Hollow after an eventful life of eighty-four years.

The principal benefactions from the Carnegie fortune are as follows:

Carnegie Corporation (educational)	$125,000,000
Libraries (3,000)	65,000,000
Carnegie Institute, Pittsburgh	25,000,000
Carnegie foundation for advancement of teaching	16,250,000
Carnegie Research Institute, Washington	10,000,000
Carnegie peace endowment	10,000,000
Carnegie educational fund, Scotland	10,000,000
Carnegie hero fund	5,000,000
Employees pension and relief fund	4,000,000
Carnegie Music Hall	2,000,000
Allied engineering societies	2,000,000

See STEEL.

Carnegie Foundation, The, an institution for the advancement of teaching. This institution was founded by Andrew Carnegie in 1904. Its purpose is to provide pensions for retired professors. It was the original intention to confine pensions to the undenominational private colleges in the English-speaking countries of North America. The Foundation is managed by a board of trustees, and by salaried officials.

The latest annual report shows an endowment of $15,414,000. The income for the previous nine months was more than $625,000. During that period more than $450,000 was paid for retiring allowances and pensions to institutions on the associated list, and to individuals outside the list more than $85,000. There are now 336 allowances and 144 widow's pensions in force, with an average pension of $1,540. Altogether there have been 736 allowances totaling more than $5,000,000.

The rules covering the grants are simple. The institution is examined and accepted. The professors are then entitled to pensions as a "matter of right," and are not required to beg for it. Any person sixty-five years of age who has served not less than fifteen years as a professor, and who draws an active salary of $1,200 or less, may retire on a yearly pension of $1,000; but the allowance is in no case to exceed ninety per cent of the salary. For each $100 of active salary in excess of $1,200, $50 is added to the pension. Thus a professor drawing $2,000 a year, and otherwise eligible, may retire on a pension of $1,400. The maximum pension allowance is $4,000. Any person who has served twenty-five years may retire regard-

less of age, and may exchange his salary for a pension which is reckoned at four-fifths of the amount allowed the older person. A widow is entitled to half her husband's allowance. In case of remarriage the pension ceases. The trustees take special action in case of physical breakdown. Meritorious individuals not in accepted institutions may be granted pensions.

Carnegie Hero Fund, a fund established by Andrew Carnegie in 1904 for the purpose of rewarding those who perform deeds of heroism. Mr. Carnegie states that it was not his purpose to increase the number of such deeds since he believed them to be acts of impulse, but that he wished to save individuals who had displayed heroism, and their families, from pecuniary suffering as a result of injuries received in the performance of heroic acts. The fund consists of $5,000,000, and is in the hands of a commission of twenty-one members. The deed of trust guards against careless or injudicious bestowal of funds. Bronze, silver, and gold medals are given and the amount of money bestowed is governed by the extent of injury and the needs of the individual. In case no injuries have been received the gift of money depends upon the hero's needs. A child or youth is often given money in trust for educational purposes. A man or woman is relieved of debts, given money toward a home, or for the future education of young children.

According to the latest statistics the commission has awarded more than 11,000 medals of bronze, silver, or gold, and nearly $2,000,000 has been paid to heroes or their families. Pensions in force amount to nearly $80,000 annually. A large amount has been awarded as relief to sufferers from disasters. Address Carnegie Hero Fund Commission, Oliver Building, Pittsburgh, Pennsylvania.

Carnegie Institution of Washington, an organization for the encouragement of investigation, research, and discovery. It was founded by Andrew Carnegie in 1902. He gave the institution $10,000,000 to start with. Later gifts bring the total to $22,000,000. It is the intention of the institution to encourage original investigators by providing funds and facilities necessary to carry on work that ordinary institutions of learning cannot afford. The funds are handled by men of scholarship and integrity. Ex-President Charles W. Eliot of Harvard is a member of the board. In 1908 a desert botanical laboratory was maintained at Tucson, Arizona; a station for experimental evolution at Cold Spring Harbor, New York; a marine biological laboratory at Tortugas, Florida; a laboratory at Washington, D. C.; a solar observatory on Mount Wilson, California; a nutrition laboratory at Harvard. A large number of special investigators were granted salaries and were given funds to be used in connection with university departments for research, especially in history, economics, and sociology. An appropriation was made to build a non-magnetic sailing vessel for magnetic observations in the Atlantic. Luther Burbank was granted a sum sufficient to enable him to devote himself entirely to experimental work. The publications of the institute number several hundred volumes. These books are sought eagerly, both at home and abroad. Most of the institute's activities during the war were governmental and secret. Two, however, were open—the experiments regarding the physical and mental activity of a man on short rations, and the reorganization of conditions for manufacturing optical glass, the output being raised from less than one ton to more than 100 tons per month.

Carnivora, flesh-eating animals. In one sense of the word a mosquito hawk is a flesh eater, so is an eagle; but the term is restricted to mammals with small heads and sharp teeth for seizing and rending their prey. Carnivora are of two groups. The first includes the seal, walrus, seahorse, etc., which may be regarded as otters with legs changed into swimming flippers. They are very agile in the water, but are clumsy and decidedly out of their element on the land. Four-legged carnivora fitted for pursuit of their prey and for terrestrial life are divided into five families:

1. The cat family, with five retractile claws on each foot,—cat, lion, tiger, leopard, etc.

2. The dog family, with five non-retractile claws on each foot,—dog, wolf, fox, jackal, etc.
3. The hyena family, long front legs and with non-retractile claws, four toes on each foot,—hyena, aardwolf, etc.
4. The weasel family, with long bodies and short legs, usually five toed,—the weasel, marten, mink, skunk, wolverin, and badger.
5. The bear family, with flatfooted (plantigrade) extremities,—the bear, raccoon, etc.

Carnivorous Plants, a group of plants whose principal food is insects that are captured in various ways, hence they are often called "insectiverous plants." They grow chiefly in swampy land where the soil is deficient in nitrogen, and the capture of insects is the plant's way of getting nitrogen which is needed for its growth. The three leading types are: The pitcher plant, the sundew, and the Venus' fly trap. In all these plants the apparatus for catching insects consists of a modified leaf or flower, forming tubes, etc., and the curious adaptations are so ingenious that it seems as if they were endowed with intelligence. See PITCHER; PLANT; SUNDEW; VENUS' FLY TRAP; BLADDERWORT.

Carnot, Marie Francois Sadi (1837-1894), a French statesman, and President of the French Republic from 1887 to 1894. He was born in Limoges, France, and educated at the Ecole Polytechnique, and became a civil engineer. Carnot won a considerable reputation as the builder of the tubular bridge at Colognes-sur-Rhone. During the siege of Paris, in 1871, he was appointed prefect of the lower Seine; but after the capitulation of Paris he resigned, and later sat in the National Assembly. Carnot held public office uninterruptedly until his election as President of France. A man of ability and uprightness, he passed through the Panama Canal disclosures of 1892 with his character unsullied. He was assassinated at Lyons by an Italian anarchist.

Caroline Islands, a large archipelago in the Pacific Ocean, in latitude 3°-12° N., and longitude 132°-163° E. There are in all about 500 islands in several groups. The archipelago was explored by the Portuguese in 1527, but was taken over by the Spaniards in 1686, and named for King Charles II (Latin Carolus).

Carolingians, or Carlovingians, a royal house of Europe. The name is derived from the Latin word Carolus, or Charles, and may be regarded as based on Charles Martel or on his grandson, Carolus Magnus, better known as Charlemagne. There were several branches. Carolingians ruled in France 752-987; in Italy, 774-961; and in Germany, 752-911. Charlemagne was the greatest of the family. Louis, "the Child," was the last of the German Carolingians. Louis V was the last of the family to sit on the throne of France.

Carp, fresh-water fishes of the family to which the chub, goldfish, dace, sucker, red-eye, shiner, and the minnow also belong. The common carp is from ten to forty inches long, and weighs from one to ten pounds. It may, in extreme cases, weigh fifty pounds. It has been kept in fish ponds for centuries in southern Europe and is still reared in the carp ponds of Germany and Great Britain. About 1872 efforts were made to establish the German carp in American water. Carp have been known to live more than 150 years.

Carpathians, kär-pā′thĭ-ans, a mountain range of Europe. The chain encircles the plains of Hungary for about 800 miles and forms a natural boundary on the northwest. The range is lower than that of the Alps, but the plants and animals are the same for corresponding altitudes. Vineyards and fields are succeeded by forests. The higher part of the ranges is above the limit of vegetation. Salt deposits of great thickness and mines of gold, silver, copper, and iron are found.

Carpenter, Frank George (1855-), an American newspaper correspondent and traveler, known to teachers and school children by his *Geographical Readers* and his industrial books—*How the World is Fed, How the World is Clothed* and *How the World is Housed.* He was born in Mansfield, Ohio, and educated at the University of Wooster, that state. He began his career as correspondent of the *Cleve-*

land Leader, and in his search for geographical knowledge, he has visited nearly every quarter of the globe. He is a recognized authority on geography.

Carpet, a woven covering for the floor or stairway. Carpets are woven usually in long strips up to a yard in width. The strips are sent to market in large rolls. Short lengths are cut off and sewed together according to the size of the floor to be covered. As distinguished from a rug, a carpet covers usually the entire floor and is fastened down by carpet tacks.

American carpets are woven by machinery. Three distinct weaves are recognized. To understand the difference it is necessary to hold in mind that the parallel threads that run lengthwise constitute the warp. The threads that run crosswise are the weft or woof. The weft and the warp woven together form a web.

The simplest weave is the ingrain carpet. It is called sometimes the Scotch carpet. Sometimes it is called a Kidderminster carpet from the English town of that name noted for carpet weaving. An ingrain may be two-ply or three-ply. A two-ply ingrain is double. It consists of two webs, let us say, a brown and a blue combined. By passing the threads up or down, the webs change sides. Wherever the blue web shows on one side, the brown web shows on the other. The figures are not unlike blisters. The blue web on one side and the brown web on the other side may be pulled apart. They are connected only around the edge of the figure. In the spaces between figures the webs may be woven together solid. A two-ply ingrain of the colors named has a blue pattern on a brown ground. Turn it over, and the pattern appears in brown on a blue ground. A three-ply ingrain is the combination of three webs—three colors. The pattern may have great variety and the body of the carpet is naturally softer and more durable. In all ingrain the surface threads lie flat. The best ingrains are made entirely of wool, though cotton and other materials are used to lessen the cost.

A second kind of carpet is the Brussels. It has a rich, corded appearance. It is built on a linen web. Worsted threads are run in and out lengthwise. These threads run over a set of crosswires. The wires are afterward pulled out, leaving a looped surface. There are usually five series of woolen threads, each of different color. The different colors rise to the surface and form the loops or lie in the body of the fabric according to the pattern. A standard five-color Brussels carpet, twenty-seven inches wide, requires 2,860 threads.

The tapestry carpet is a variation of the Brussels. Instead of five or six sets of differently colored woolen threads, the tapestry is woven, loop fashion, with one set of threads worked into the linen web. The pattern effect is secured by printing the thread in lengths, a few inches or feet of one color, then a few inches or feet of another color. Although each thread is of all colors, a single thread gives no idea of the pattern. Arranged side by side, however, elongated patterns may be seen. A pattern nine feet long in the thread is shortened to two feet in the looped and completed tapestry. The dyeing of the threads is accomplished by winding them on a drum, side by side, and printing them in color. Miles of parallel threads are wound up and stained at once.

The third important weave is the Wilton or Moquette. It differs from the Brussels in that the loops are cut before the wires are withdrawn. When laid for use, the foot presses on the loops of the Brussels carpet; but a Wilton carpet presents the ends of the cut fibers to the foot. These carpets are known also as pile carpets and velvet carpets. The Axminster is a pile carpet.

The first American carpet makers learned the art chiefly in Axminster, Kidderminster, Wilton and other British weaving centers. The British had their start from France and Belgium. The art may be traced backward to Turkey, to Persia, and to the East Indies. Aside from homemade rugs and carpets, the first American carpet was made by William Sprague at Philadelphia in 1791. It was an Axminster. Lowell, Massachusetts, became a center of carpet weaving. American manufacturers have been protected and encour-

aged by a high tariff on foreign carpets. Entire factories, finding their product barred from the American market, the best carpet market in the world, moved their looms and weavers from Scotland and England to American soil. The United States now leads the world in this manufacture. According to the last census 125 firms were engaged in carpet weaving, operating 83,000 power looms, with an annual output of approximately 100,000,000 yards, worth $50,000,000 at wholesale. Pennsylvania leads the Union in carpet weaving. In 1900 over $23,113,058 worth, or forty-eight per cent of our entire output of carpets, came from the looms of that state.

The old-fashioned rag carpets, once the housewife's pride, are distinctly American. They are still made and not infrequently in handsome patterns. The Navajo Indians, famous also for basketry, weave beautiful rugs and blankets in striking colors, which have lately attracted attention and command large prices.

See RUG; SHAWL; WEAVING; NAVAJO.

Carpet-Baggers, a term of reproach applied by the people of the Southern States to political adventurers from the North. At the close of the Civil War a swarm of Northern men, often without principle, and usually without property interests, located in the Southern States with a view to use the negro vote to secure office. These unscrupulous, moneyless officeholders were not inappropriately dubbed "carpet-baggers." Consult Thomas Nelson Page's *Red Rock,* a recent novel, for a Southern view of the case.

Carpet-sweeper, an implement for sweeping carpets and rugs. It consists of a brush set in a case equipped with wheels and a handle for operating it. The brush is so placed that when the case is pushed over the carpet, the brush is caused to revolve, gathering dust, lint, etc. into the receptacles on either side and confining it there until emptied by tne operator. The carpet-sweeper will not make a carpet as clean as will a good broom, but it gathers the dust instead of scattering it, and therefore fills a place of importance in the economics of the household.

Carranza, Venustiano, a Mexican general and leader. He was born about 1860. Carranza as governor of Coahuila, refused to recognize the government of General Huerta. On March 26th, 1912, Carranza was appointed commander in chief of the Constitutionalist party. After the retirement of Huerta and the practical elimination of Villa, his government was recognized by the United States in 1915. He was overthrown and slain in 1920.

Carrara, kär-rä′rä, a town of Italy situated on a small stream of the Apennines midway from Leghorn to Genoa. It is about ten miles from the sea. It is noted chiefly for its quarries, now over 2,000 years old. Carrara marble is a pure white, fine, sugar-grained stone long celebrated in art. It is the choicest marble known. The famous sculptors of Florence, and indeed of all Europe, were wont to work at Carrara to save the expense of transporting stone. The city now maintains a school of sculpture and is a place of some culture. In addition to the pure white carrara of the sculptors, the district has unlimited cliffs of marble for building purposes. The Pantheon of Rome and many other famous buildings are of Carrara stone. Population 50,000.

Carriage, a wheeled vehicle designed to carry people on ordinary streets and roads. Two-wheeled carts or chariots were known to the Assyrian and Egyptian. It may be remembered that David brought home the Ark in a new cart, and that "the anger of the Lord was kindled against Uzzah and He smote him" for putting his unhallowed hand on the Ark when the oxen drawing the cart stumbled over rough ground. For want of roads in former times, four-wheeled carriages were comparatively rare. It is believed that beyond the rudest sort of peasants' carts, there were not a dozen carriages or coaches in all Europe when America was discovered. The bodies of the earlier carriages, were hung on straps by way of springs. The carriage spring passed through several stages. The first attempt to relieve the jar of riding was the suspension of the box by leathern straps from stiff iron arms or jacks rising in

front and behind from the axles. Then it occurred to some one to give the upper ends of the jacks a little spring. The next step was to coil the upper ends of the jacks into springs having the shape of the letter C. Elliptical steel springs have been in use about a century. The very names of the various kinds of carriages are bewildering. Gig, sulky, and go-cart; chaise, calash, cariole, coupé, hansom, and jaunting car; coach, brougham, barouche, rockaway, landau, and victoria; buggy, phaeton, and surrey; cab, hackney, fiacre, and drosky; drag, carryall, and tally-ho; wagonette, barge, stage, and omnibus; dray, express wagon, and van; cart, truck, and farm wagon,—there is no end to the classes, styles, and variations.

The manufacture of carriages in the United States reached its highest point just before the introduction of the dependable, moderate-priced automobile. This vehicle has now practically driven the carriage out of the market in cities and in many rural districts as well, since farmers find the automobile to be a paying investment. Besides saving time in travel, the automobile also saves the keep of one or two horses. Numerous carriage factories have now become factories for automobiles. See WAGON; CAR; AUTOMOBILE.

Carrier, in literature, one who conveys parcels. In Dickens' *Cricket on the Hearth,* the carrier with his cart makes daily trips, executing errands and carrying parcels for a small charge. When Carlyle was at the University of Edinburgh the weekly carrier was entrusted with oatmeal, cheese, and clean linen from the Annandale home. In Great Britain and on the continent the private carrier has been superseded by the carts of the government parcel post. Scarce a rural highway is without its post wagon. The postman collects and delivers boxes, packages, parcels, and baskets, at a nominal charge—scarce a fraction of our express costs—not to mention the convenience to rural sections, such as our private express companies do not reach at all. It is thought by many that our rural free delivery postal routes may develop into a parcel post service.

In law, any individual or company that undertakes to carry for pay is called a common carrier. A common carrier, as a railroad or steamboat, must carry for all who can pay the charge, and may be held responsible for needless delay or damage to goods in transportation. The same principles apply to passenger service.

Carrier Pigeon, a bird of strong flight employed to convey messages. Before the day of the telegraph and the steam engine, carrier pigeons were much used to carry information. The whole secret lies in the fondness of the pigeon for its old home. If the Rothschilds of London, for instance, wished early intelligence of some expected event in Paris, they sent pigeons from their London loft by a messenger to their Paris house, where at the proper time a note was written on thin paper and was fastened closely around the shin of the pigeon's leg. The pigeon was then released and flew homeward to his old loft with the news still wrapped around his leg. Great pains were taken to train pigeons by taking them first on a short journey, and then farther away from home. When a carrier pigeon is released with its message, it rises in circles until it gets its bearings and then flies straight away for its home. Thirty miles an hour is an ordinary flight, although a speed of ninety miles an hour is on record. If the distance be great, the pigeon rests at night. If a pigeon be released from a balloon, it will drop like a plummet until near enough the earth to get its bearings; then it homes in a straight course. An American pigeon has been known to fly 1,040 miles without stopping.

The use of carrier pigeons reaches back into antiquity. Someone has suggested that the dove let loose from the ark was a carrier pigeon. When an Egyptian king was crowned it was customary to let carrier pigeons from the various provinces fly homeward with the announcement of the ceremony. Wealthy Romans carried pigeons in baskets into the amphitheater for the purpose of sending home the names of guests whom they were inviting, or to make a change in the dinner. The birds rarely failed in their mission.

Carrier pigeons were employed at the siege of Jerusalem. The Saracens made frequent use of this means of carrying information during the Crusades. During the Napoleonic wars, news of great battles were transmitted by carrier pigeons in advance of couriers. During the siege of Paris by the Germans in the Franco-Prussian War, the Parisians communicated with the outside world by pigeons as well as balloons. Military information was sent frequently in cipher. Since the invention of the telegraph the practical value of carrier pigeons is trifling, except in wartime activities.

In the World War very important messages were delivered by pigeons when no other means was available. Every year a pigeon "Derby" is flown from Nantes, France, to Lancashire, England. At one of these events 7,113 birds were taken across the English Channel. They were carried in 687 crates and required a train of fourteen railway cars. All were liberated at once. The winning bird made the trip of 450 miles from Nantes to its English home, and was cooing in the dovecote in less than eight hours. See PIGEON.

Carroll, Charles (1737 - 1832), an American revolutionary patriot, was born at Annapolis, Maryland, and educated abroad, chiefly in France. Returning to America in 1765, he settled on an estate in Frederick County, the family name of which was Carrollton. Hence he always signed his name as *Charles Carroll of Carrollton*, to distinguish himself from all others who bore the name of Carroll.

Carroll was chosen one of the Committee of Observation at Annapolis in 1775, and in the same year he was sent to the provincial convention. He was a member of the commission sent to Canada in 1776 to seek the aid of the Canadians in the war against England. He was a signer of the Declaration of Independence; was a United States Senator in 1798; and in 1799 a member of the Maryland-Virginia boundary commission. He died at the age of 95, the last survivor of the 56 signers of the Declaration of Independence.

Carroll, John (1735-1817), cousin of Charles Carroll, and first Roman Catholic bishop in the United States. He was educated at Flanders, and later was sent to Liége and Bruges. He returned to the United States in 1775, and in 1784 was appointed vicar-general, and in 1790 was in England consecrated Catholic bishop of the United States, and returned with the title of Bishop of Baltimore. A few years before his death he was created archbishop, his see being made the archdiocese of Baltimore.

He was the founder of Georgetown College in 1791. He died in Georgetown, D. C., December 3, 1817.

Carroll, Lewis, the pen name of Charles Lutwidge Dodgson. See DODGSON.

Carrot, a well known vegetable. The original plant grows wild in Europe and northern Asia, but the root is small and tough. It was cultivated at an early date in Belgium and in France. It is related to the parsnip. The seed stalks are arranged like the rays of an umbrella, as is the case with all plants of the umbelliferous family. The carrot of one year raises seed the next year. The seeds are valuable for medicinal purposes. The spindle-shaped root is rich in nitrogen and is valued for the table and for cattle. Sheep are fond of carrots. Over 2,000,000 bushels a year are raised in the United States. Oil of carrot, obtained from the root, is used in tanning leather. The carrot was brought to Virginia in 1609 and carrot seed was sown at Plymouth in 1621. The Indians of New England and New York obtained seeds from the white people. A cross section of a carrot shows an outer ring and a central core. As the ring tastes better and is more valuable for food, plant breeders are trying to produce a variety that shall have a small core or even none at all. See VEGETABLES.

Carson, Christopher (1808-1868), known usually as "Kit" Carson, a celebrated American trapper, guide, and soldier. He was born in Madison County, Kentucky, December 24, 1808. He died at Fort Lynn, Colorado, May 23, 1868. When a lad he was set to learn the saddler's trade, but forsook it for a hunting expedition. He served Frémont as a

guide. In 1847 he was sent to Washington with dispatches, and received an appointment as an American scout. In 1853 he drove a flock of 6,500 sheep overland to California. He served for a time as an Indian agent in New Mexico. During the Civil War he served in the army and was made a brigadier-general. Carson City, Nevada, was named for him. See FRÉMONT.

Carson City, the capital of Nevada, sixteen miles from Lake Tahoe. It is situated at the base of the Sierra Nevada mountains near celebrated mineral hot springs. Mining, lumbering, and agriculture are the chief industries. The famous Comstock Lode is but eighteen miles away. There are railroad and machine shops in the town. The state capitol building and a U. S. mint are located here. The state prison is two miles distant, and a government school for Indians is three miles south of the city. The population in 1920 was about 2,500.

Carson, Edward Henry, Baron (1854-), a British statesman and lawyer, was born at Dublin, Ireland, and educated there at Trinity College. Entering Parliament in 1892 as member for Dublin University and as Solicitor-General for Ireland, he at once took an active part in all questions pertaining to Ireland, and soon became known as a bitter opponent of the Irish Nationalists. After 1900, Sir Edward was regarded as the spokesman of the Irish Unionists in Parliament. When, in 1911, a new Home Rule bill was in view, he came to the front as a political figure of the first importance, and by 1912 was the recognized leader of the Ulstermen in their fight against Home Rule. In the year following he moved in Parliament to exclude Ulster from the operation of the Home Rule bill, but was unsuccessful. The Ulster Unionist Council was organized under Sir Edward's supervision in 1913. He declined Mr. Asquith's compromise proposal with reference to Ulster, and just when it appeared that he and his Ulstermen would have to make good on their armed force covenant, the World War opened and Sir Edward's activities centered elsewhere. He was concerned for a speedy and thorough prosecution of the war, joining the coalition ministry in 1915 as Attorney-General, but leaving in a few months because he was out of sympathy with the cabinet on the campaign in the Dardanelles. When the war closed Sir Edward again turned his attention to Ulster, taking active measures for Ulster's remaining in the United Kingdom; but when Ulster was granted a parliament of its own, he gradually moderated his views and curtailed his activity, declining, however, to sit in the new parliament. He retired from active politics in 1921, accepting a lordship of appeal and a peerage.

Carte Blanche, cärt-blänsh′, literally a white card; hence a blank paper, and then an official document duly signed, but left to be filled out at the discretion of the officer or person to whom it is intrusted. For instance, in 1649, Charles II tried to save his father's life by sending from The Hague to Parliament a signed *carte blanche,* to be filled up with terms they would accept as the price of his safety. The term now means unlimited authority.

Carthage, kär′thĭj, a famous Phoenician colony on the coast of North Africa. According to tradition it was founded by Queen Dido, who fled from Tyre with her followers. She bought as much land of the Africans as might be covered by an ox hide. In selecting the land the hide was cut into a thong, and as much territory was claimed as could be surrounded by the hide. While without foundation the tradition typifies the dealings of Carthage with its neighbors. The date of its founding is given commonly as 878 B. C. Tyre and Carthage appear to have been allies.

Carthage appeared on the scene as one of the great Mediterranean powers about 600 B. C. While Greece was grappling with the Persian invasions, Carthage seized what seemed a favorable opportunity to attack the Greek colonies in Sicily and southern Italy. Though unsuccessful, the attempt showed an early ambition to be supreme in the Mediterranean world. Carthage had the finest harbor in North Africa, only 100 miles distant from the island of Sicily. The city was governed by a council, or senate, of 100 rich mer-

chants. Its army was drawn from the Carthaginian provinces,—from Africa, war elephants, black Libyans armed with pikes, and Numidians, who rode fleet horses, like the Cossacks of today. They were dressed in the skins of lions, and were armed with lances and bows. Bands of Iberians with sharp-bladed swords were brought from Spain, and companies of half-naked Gauls were hired to fight with great two-handed swords. From the Balearic Isles they drew companies of slingers, who threw pebbles or balls of lead.

The Carthaginians claimed exclusive control of the western Mediterranean, and ships went as far as the British Isles for tin. If the inhabitants of a Mediterranean town permitted a ship from any other country to touch for trade they were punished. If a foreign ship was overtaken, its rowers were pitched into the sea and the ship confiscated. The Carthaginian merchants sent to Tyre for cargoes of oriental productions brought by a caravan from the far East. Silver they obtained from the mines of Spain and Sardinia. They had oil and wheat to sell from vast African estates, worked by slaves or subject people. Their own workmen made jewelry, arms, and idols for the trade.

Carthage was a proud, powerful, wealthy city until it came into conflict with Rome. Two such cities as Rome and Carthage could not exist as neighbors. A deadly grapple followed, lasting 215 years. Carthage had the most powerful navy in the world, with more money and more men than Rome. Three wars followed in quick succession. They are called the Punic Wars, a shortened term for Phoenician. The First Punic War lasted from 364 to 341 B. C. At its beginning the Carthaginians declared, "Without our permission, Rome cannot even wash her hands in the sea." Rome, however, built up a navy and, after suffering several defeats, finally vanquished the Carthaginians and laid waste Carthaginian territory in Africa. As the result of this war, Carthaginian supremacy on the Mediterranean was lost. Sicily, Sardinia, and Corsica passed into the hands of the Romans. One scheme by which the Romans gained a great advantage was the invention of a platform hinged at one end to the Roman ship, something like the drawbridge of a castle. Upon approaching a Carthaginian ship this drawbridge, filled with armed men standing behind their shields, was lowered until the outer end rested on a Carthaginian deck, affording the Roman soldiers an opportunity to attack at a great advantage.

The Second Punic War was precipitated by the Carthaginians who invaded Italy with a large army by way of Spain, France, and the north. Hannibal was in command. He very nearly brought Rome to the verge of ruin, but failed to capture the largest cities. The Romans under Scipio carried the war into Africa, and Hannibal was summoned home with his army to defend Carthage. The result of this war was a complete defeat for Carthage. It became, in a way, subject to Rome.

The Romans, however, did not feel safe. Cato, the senator, returned from an embassy to Carthage, and exhibited some enormous fresh figs that he had brought back with him, and declared that they were produced but three days' journey from Rome. He dwelt at length upon the danger of permitting so powerful an enemy to exist, and closed his speech with the words, repeated upon every possible occasion: "Carthage must be destroyed." Military operations began 149 B. C. In the spring of 146 B. C. the city was taken in an assault lasting seven days. The inhabitants were killed or sold as slaves, and the city was set on fire.

Cartier, Sir George Etienne (1814-1873), a Canadian statesman, was born at St. Antoine, Province of Lower Canada, and educated at the College of St. Sulpice, Montreal. Admitted to the bar in 1835, he began to rise high in his profession; but because of his part in the rebellion of 1837-38 he was forced to leave the country. He returned, later, resumed his practice, and entered Parliament in 1848. Taking his place as the leader of the Liberal Conservative element, Sir George was at the forefront of Canadian affairs for the succeeding twenty-five years. He became pro-

vincial secretary in 1855, Attorney-General of Lower Canada in 1857, and from the latter year until 1862 was joint Premier with Sir John Macdonald. During this time he consistently stressed the need of adequate railroads in Canada, and was an exceptionally active proponent of confederation. He was very largely responsible for Quebec's accepting the Dominion. During Sir John Macdonald's first administration, 1867-73, Sir George was Minister of Militia and Defense. He was defeated in an electoral contest in 1872, and left for England, where he died.

Cartier, kär-tyā′, **Jacques** (1494-1557?), a French navigator. His first voyage to the New World was made in 1534, when he discovered the St. Lawrence river. He reached Newfoundland, discovered the straits of Belle Isle, and, landing on the mainland of Canada, took possession of it in the name of his sovereign, Francis I. The next year he sailed up the St. Lawrence river to the site of Montreal. There he found an Indian village to which he gave the name of Mont Royal. In 1541 he undertook a third expedition, intending to found a settlement. He did build a fort near the site of Quebec, naming it Charlesbourg, but it was soon abandoned. The exact date of Cartier's death is unknown.

Cartoon, a sketch or drawing on strong paper or cardboard to be used as a model for large pictures in frescoes, tapestry, mosaics, etc. The cartoon is the full size intended for the permanent picture and the design thus sketched may be transferred to the surface to be painted, or it may be copied. Cartoons, if by some famous artist, may themselves be of value after they have served as models. Nine of the twenty-five original cartoons painted by Raphael for the Vatican tapestries are still in existence, and are preserved at the South Kensington Museum, London. The cartoon has become an acknowledged feature of the public press, and its influence in swaying public opinion on questions of the day is universally acknowledged. See CARICATURE.

Cartridge. See AMMUNITION.

Cartwright, Edmund (1743-1823), an English clergyman and inventor, was born at Marnham, Nottinghamshire, England. Educated at Oxford, he obtained a living in the English Church until he was 40 years old. His attention was turned toward mechanical questions and appliances through a casual conversation; and in 1785 he exhibited the crude machine that set the standard of construction and operation for the gigantic power looms of today. Cartwright was opposed in his work by manufacturers and working men, and the first mill erected for power weaving was burned down. Cartwright also invented a wool carding device, and he worked with Fulton in his steamboat experiments. In 1809, he was granted $50,000 by Parliament in consideration of his services to England. He died in October, 1823. His daughter wrote a *Life,* published in London, in 1847.

Cartwright, kärt′rīt, **Peter** (1785-1872), a famous circuit preacher. He was a native of Virginia. He died at Pleasant Plains, Illinois. In 1806 he was ordained by the Methodist church of Kentucky. He was a famous outdoor revivalist, a power in the camp meetings for which pioneer Kentucky and Illinois were noted. He was a man of ready wit, earnest eloquence, and sound common sense, but withal somewhat eccentric. On one occasion, it is related, he came down from the pulpit and threshed a rowdy who was disturbing the meeting. He then went back to the pulpit and finished his discourse. His rough and ready ways gave him a strong hold on the settlers. He sat in the legislature of Illinois. In 1846 Abraham Lincoln defeated him in an election for Congressman. In his *Autobiography* he tells us that he traveled sixty-five years, baptized over 12,000 persons, and preached over 15,000 sermons.

Caruso, ka roo′zo, **Enrico** (1873-1921), an Italian operatic singer, the most famous tenor of his day, was born in Naples. At the age of 11 he began to sing in churches and at 23 he began his operatic career. His success was assured from the first, and he sang repeatedly in the leading European cities before coming to America in 1904 to fill an engagement with the Metropolitan Opera Company in New York. His success was phenomenal, and he visited this country professionally nearly every

year since. Caruso's success was due to a voice of remarkable power, sweetness and range.

Carver, John (1576-1621), the first governor of Plymouth colony, the first permanent English colony in New England. He was born in England, but sought refuge with other Puritans at Leyden. He sailed in the Mayflower for the New World and was elected governor before a landing was made. His rule was wise, just and firm, but very short, for he died four months after his arrival. See PLYMOUTH COLONY.

Carver, Jonathan (1732-1780), an American explorer. He was a native of Stillwater, New York, and died in London. In 1756 he commanded a company of colonial rangers in the invasion of Canada. On the conclusion of peace he obtained a halfway commission to explore the vast territory lying west of the Great Lakes. In 1766 he set out from Boston. He traveled by way of Mackinaw and struck westward to the Mississippi at Prairie du Chien. He visited the Falls of St. Anthony, bargained with the natives, it is said, for a grant of land where St. Paul now stands, and explored the northern border of Lake Superior. In 1768 he returned to Boston and soon set sail for England to lay his charts and reports before the authorities, by whom he hoped to be recompensed for his outlay. In this he was disappointed. The lords commissioners required his charts, but gave him no money. In 1778, while earning a living as a clerk, he managed to bring out an edition at Boston of his *Travels Through the Interior Parts of North America.* It is an interesting account of the country and the manners, customs, ceremonies, dress, languages, and mode of living of of the Indians he had seen.

Carving, a branch of sculpture from which it is distinguished by the use of soft material, as ivory and wood. A walkingstick with a carved ivory head was an indispensable part of the equipment of a Babylonian gentleman. The Greeks employed carved ivory in the construction of their statues and colossal gods. The remains of early Christian art, whether in ivory or wood, are richly carved. The finest specimens of woodcarving, however, are to be found in the altar work, pews, doors, chairs, tables, and halls of the medieval churches, and in the homes of the merchant princes. Ravenna, Prague, Nuremberg, Augsburg, Antwerp, Bruges, and, generally speaking, the cathedral towns and the cities of the Hanseatic League have richly carved woodwork. Oak carvings are a feature of the stairways, halls, and pews and altar work of old English houses and churches. Westminster Abbey possesses some fine carvings, both medieval and modern. Germany has ever excelled in this branch of art. The Black Forest region still maintains its reputation for carved work of artistic merit, as well as for toys, parlor and hall ornaments, and for clock work. The establishment of manual training schools bids fair to create a revival of interest in wood work of this sort. See SCULPTURE.

Cary, kā′rĭ, **Alice and Phoebe,** American poets. They were the children of a plain farmer near Cincinnati. Alice was born April 26, 1820; Phoebe, September 4, 1824. They were educated in the district school. Alice was tender and sad; Phoebe, witty and joyous. Their mother died while they were young. They did the housework together and began writing poetry and articles for such magazines as would accept their contributions. Whittier gave them much encouragement. In 1849 a volume of their poems was published. The next year Alice went to New York to live, and sent for Phoebe a few months later. Money began to come in from their writings. Soon they were able to move into a pretty little house where the literary people of the city, including Horace Greeley, a staunch friend, were quite in the habit of dropping in for an evening, or at a weekly reception. Both sisters died in 1871, Alice first, and were buried in Greenwood Cemetery, Brooklyn. In life and in death the sisters were inseparable; their poems are published together in a single volume. Instead of trying to tell the good they did, and instead of giving the names of their chief poems, we take the space for a quotation from each, and a quotation from a poem

by Whittier written on the occasion of Alice's death:

With hand on the spade, and heart in the sky,
  Dress the ground and till it;
Turn in the little seed, brown and dry,
  Turn out the golden millet.
Work, and your house shall be duly fed;
  Work, and rest shall be won;
I hold that a man had better be dead
  Than alive, when his work is done.

—Alice Cary, *Work.*

One sweetly solemn thought
  Comes to me o'er and o'er;
I am nearer home today
  Than I ever have been before;

Nearer my Father's house,
  Where the many mansions be;
Nearer the great white throne,
  Nearer the crystal sea;

Nearer the bound of life,
  Where we lay our burdens down;
Nearer leaving the cross,
  Nearer gaining the crown!

—Phoebe Cary, *Nearer Home.*

Unseen of her, her fair fame grew,
The good she did she rarely knew;
Unguessed of her in life, the love
That rained its tears her grave above.

—Whittier, *The Singer.*

Caryatid, kăr-ĭ-ăt′ĭd, a figure of a woman in long robes taking the place of a column in architecture. The Greek plural, the Caryatides, is the name of a remarkable series of six marble figures of this sort employed to uphold the roof of the porch of a temple adjoining the Parthenon in Athens. Just what motive the Greeks had in employing female figures is not known. It has been suggested that they represent slaves taken in war; but the grace and dignity of these sculptured forms precludes the thought of their being introduced as a mark of subjection or slavery. They are about seven feet in height. The originals still stand, and form one of the most beautiful portions of the remarkable ruins on the Acropolis. The use of caryatides was not uncommon in Greece and Rome. Male figures used for the same purpose were called atlantes.

Casabianca, kä-sä-be-än′kä, **Louis,** a French naval officer. He was captain of the flagship L'Orient in the battle of the Nile, August 1, 1798. He was mortally wounded and his ship caught fire, but his little nine year old son would not leave the ship without a permission that his dying father could not give. The ship exploded and both were lost. Mrs. Hemans has celebrated the bravery and obedience of the little fellow in a well known poem beginning,

The boy stood on the burning deck
Whence all but him had fled.

Cascade Mountains, a range of western mountains. The Cascades run parallel to the Pacific coast from California northward into Alaska. In British Columbia and Alaska the Cascades crowd the Coast Range off into the sea. The line of elevation is marked by a number of mountains of volcanic origin. Wrangel, St. Elias, Logan, Fairweather, Vancouver, Shasta, Tacoma or Rainier, Adams, and Hood are the most noted peaks. The range is cut by river gorges, notably by that of the Columbia. The Great Northern Railway crosses the summit in Washington by means of the Cascade Tunnel. This tunnel is wide enough for a double track and is twenty-one feet six inches high. It is faced with concrete and is 2.6 miles long.

Cash, a foreigner's name for the copper coin of China. These coins are thinner and smaller than our cent and are provided with a large square hole in the center by means of which they are tied up in bunches like beads on a string. A single cash is worth rather less than a tenth of a cent. The small value of the coin is in keeping with prevalent wages and with the small parcels in which articles of food are sold at retail in China. See Coin.

Cashew, kă-shōō′, a small, spreading, tropical tree. It is native to the West Indies. The cashew is an excellent example of a tropical plant put to many uses of which people in a north temperate climate have little knowledge, and in which they cannot be expected to take a special interest. The cashew nut is a kidney-shaped bean an inch in length. It has a pleasant, oily taste, and is used as an article of food, either raw or roasted. A sweet oil, pressed from the kernels, is used like olive oil for cooking. The fruit stalk, corresponding to the stem of a cherry, is swollen and fleshy like a pear in shape, and

is eaten as a cashew apple. A kind of wine is made from its juice. The roasted nuts are used to flavor cocoa in the manufacture of chocolate. The acrid vapor which escapes in roasting is likely to cause erysipelas. A gum similar to gum arabic exudes from the bark of the tree.

Cashmere, the northernmost principality of India. It lies directly west of the Himalaya Mountains, and includes the upper windings of the Indus River. The Vale of Cashmere, which gives its name to the province, is a beautiful valley celebrated in oriental literature, but better known in modern times as the home of the goat from whose wool, or hair, the famous Cashmere shawl is made. The whole principality has a population of 3,000,000. The Vale of Cashmere has an area of 4,000 square miles. It is surrounded by beautiful scenery and snow-capped peaks, whose splendor and sublimity are said to be beyond description. The valley is about 5,000 feet above the sea. It is well watered, and is blessed with an abundance, which, together with its natural beauty, makes it the "Paradise of India." Forests, fields, and rice plantations, rich orchards and vineyards, mulberry trees raised for the production of silkworms, violets, roses, and jasmines are abundant on every hand. About one-third of the inhabitants are Hindus; the rest are Mohammedans. The province is not, however, very prosperous. Its few manufactures, especially that of the Cashmere shawl, are declining. The towns are dirty and the inhabitants unprogressive. Some improvements, it is asserted, have been introduced by the British government. A railway has been extended into the province from the south. Improved methods of agriculture are also in process of introduction.

Cashmere, a variety of light weight, fine twilled, woolen dress goods. It is dyed in plain colors. It is soft and fine, and of pleasing appearance. A fine wool material made from the wool of the Cashmere goat was imported into England in 1820. The cashmere known at the present time is one of the many imitations of this cloth, which, in turn, was an imitation of the plain portions of the famous Cashmere shawls. The chief peculiarity in the weaving of cashmere is that it is made of a "single" warp. This means that the yarn forming the warp is composed of one fine, single thread instead of two or more threads twisted together as one. In order to stand the strain put upon it, this "single" thread of cashmere must be of the best raw material, tightly twisted. It is run through a solution called sizing, which adds strength, just as a string might be made stronger by dipping it in mucilage or varnish. Cashmere is made up usually "in the gray" or natural color. It is held in stock, and is dyed only to fill orders and in such colors as happen to be fashionable. A cheaper grade of cashmere is made with cotton warp, but it is less durable, and the colors are less permanent. A well made cashmere is one of the most serviceable dress materials ever manufactured. Its beauty lies in the evenness of the weave, and its soft draping qualities. It may be washed as easily as cotton.

Cashmere Goat, a variety of the common goat found in the mountainous regions of Tibet and the Indian principality of Cashmere. Its natural food consists of twigs, buds, and heather. The farther up the mountains, the finer and softer the wool, and the deeper its color. The latter varies from an ochre, well up the mountains, to pure white, far down in the valleys. A thick body of fine, curly wool lies next the skin, beneath long outside hairs. A full grown goat yields about one-half pound of fine wool. It is worth from $9 to $12 a pound. The wool of from six to ten goats is required for a Cashmere shawl, according to its weight. Genuine Cashmere shawls made from the wool of the Cashmere goat in the Vale of Cashmere are rare. In America genuine Cashmeres are worth from $70 to $1,500. The hair is spun and dyed by women. The shawls are woven on rude hand looms, but are fine, and involve such intricate patterns that the time of two or three weavers is required for a year to produce a single shawl. A careful investigation would show that these shawls are woven in strips which are sewed together with great skill. Several thousand hand looms are in opera-

tion; but a large amount of wool is imported from other districts, so that a large part of the actual output of the Vale of Cashmere is far from genuine. See RUG; SHAWL.

Cashmere Shawl, a fine woolen shawl made originally in India. The genuine shawl was for centuries one of the most costly and highly prized articles of commerce. Three thousand dollars has been paid for a single shawl, although it is claimed that few, if any, of the best specimens leave India. These shawls are made from the fine, downy wool found about the roots of the hair of the wild goats of Tibet and the Himalayas. They have been made, it is believed, for 4,000 years. The down is separated from the coarse wool, and is spun by hand. The fiber is so short that spinning is a work of difficulty. The weaving is done in a rude hand loom; three or four men sometimes working for a year to produce one shawl. This tedious process, and the fact that the Cashmere goat has not been reared successfully outside of Tibet, account for the costliness of these shawls. They are made in several styles. Some are wholly of one piece and are dyed in a solid color. Others are made of small strips or squares set together with marvelous skill. Either style may be embroidered. Cashmere shawls have been imitated in many places. The most famous imitations are the Broché (brō-shā′) shawls of France and the Paisley shawls of Scotland. Cashmere shawls have been called erroneously camel's hair shawls, from the popular belief that they were made of camel's hair. The plain Cashmere shawls are called chudders or chuddahs in Europe and America. See CASHMERE; CASHMERE GOAT; SHAWL.

Caspian Sea, the largest lake in the world, not fresh water. It lies on the borderland between Europe and Asia. Its greatest length from north to south is 730 miles; its greatest width, 270 miles; its area, about 170,000 square miles, nearly twice that of the American Great Lakes combined. The surface is 85 feet below that of the ocean. The water is less salt than that of the ocean, but is yellow in color, and exceedingly bitter. It is, of course, without an outlet, but has a number of tributaries, including the Volga, the largest river in Europe. Rapid evaporation prevents the water from rising. There are valuable fisheries, including those of carp, perch, trout, and especially sturgeon. Porpoises, seals, and tortoises are taken on the northern coast. A fleet of fishing and merchant ships finds shelter in the various harbors. Baku, at the western end, is celebrated for petroleum oil; Astrakhan, on the Volga near its mouth, is the principal Caspian port. Portions of the sea are very deep, possibly over 3,000 feet, but numerous shallows prevent the employment of vessels having draft to exceed ten feet. See ASIA; VOLGA; BAKU.

Cass, Lewis (1782-1866), an American statesman. He was born at Exeter, New Hampshire. He entered the practice of law in Zanesville, Ohio. He became a brigadier-general in the War of 1812, and was at the battle of the Thames. In 1831 he was appointed governor of Michigan territory, then extending to the headwaters of the Mississippi River. In this position he showed no little ability in handling the Indian questions of the Northwest. Subsequently he published a volume entitled *Inquiries Concerning the Indians.* A magnificent body of water in northern Minnesota is known as Cass Lake. General Cass was appointed secretary of war under Jackson, and in 1836 was sent as minister plenipotentiary to Paris. Later he became senator from Michigan and was secretary of state in Buchanan's cabinet. In 1848 he ran for the presidency, but was defeated by General Taylor. An echo of the campaign may still be heard in the *Bigelow Papers.*

Gineral C. is a dreffle smart man;
He's ben on all sides that give places or pelf;
But consistency still wuz a part of his plan,
He's ben true to one party,—an' thet is himself;
So John P
Robinson he
Sez he shall vote fer Gineral C.

Gineral C. he goes in fer the war;
He don't vally principle more'n an old cud;
Wut did God make us raytional creeturs fer,
But glory an' gunpowder, plunder an' blood?
So John P.
Robinson he
Sez he shall vote fer Gineral C.

Cassan′dra, in Greek legend the fairest princess of Troy. She was the daughter of Priam and Hecuba, consequently the sister of Hector and of Paris, whose theft of Grecian Helen brought the war upon the Trojan city. According to one legend, Cassandra and her twin sister were left overnight on a couch of laurel in the temple of Apollo. In the morning the sisters were found with two serpents licking their ears. As a consequence, Cassandra was gifted with such acuteness of ear that she could hear the conversation of the gods, and was able to prophesy. She foretold the fall of Troy and protested frantically against the admission of the wooden horse within its walls; but Apollo, whose advances she had repulsed, was angry and caused her protests to be made in vain. At the fall of the city, she fled to the temple of Minerva, but was torn away and abused by Ajax. She was taken to Greece as one of the slaves of Agamemnon, and was put to death by his wife, Clytemnestra. Cassandra was a favorite subject with ancient poets and sculptors. Modern writers also have found material in her story. She appears in Shakespeare's *Troilus and Cressida.* In Schiller's poem, *Cassandra,* the prophetess is represented as bewailing her fate in not being believed.

And men my prophet wail deride!
The solemn sorrow dies in scorn;
And lonely in the waste, I hide
The tortured heart that would forewarn.
Amid the happy, unregarded,
Mock'd by their fearful joy, I trod;
Oh, dark to me the lot awarded,
Thou evil Pythian God!

Thine oracle, in vain to be,
Oh, wherefore am I thus consigned,
With eyes that every truth must see,
Lone in the city of the blind?
Cursed with the anguish of a power
To view the fates I may not thrall
The hovering tempest still must lower,
The horror must befall!

Those who foresee and predict the downfall, meet the fate of Cassandra.—*The Times.*

Cassava, kăs′sä-vȧ. See TAPIOCA.

Cassia, kăsh′ȧ. See SENNA.

Cassimere, kăs′sĭ-mēr, a general term employed to designate a large class of woolen fabrics used for men's clothing. They are woven plain, twilled, and in a variety of fancy effects. The yarns are spun from wool prepared by the carding process. The patterns are produced in the loom and are usually plaids, checks, and stripes in quiet colors. The quality of cassimere differs greatly. It is made sometimes with a cotton warp and wool or shoddy weft. This is called union cassimere. It has been estimated that fully one-half of the men's ready-made clothing produced in the United States is of cassimere.

Cassiopeia, kăs-ĭ-ō-pē′ya, in Grecian mythology, an Ethiopean queen, wife of Cepheus and mother of Andromeda. Cassiopeia was so proud of her daughter's beauty that she boasted that it surpassed that of the Nereids or sea-nymphs. The incensed nymphs begged Poseidon for vengeance. In response to their prayer a deluge laid waste the dominions of Cepheus, and a fearful monster appeared on the coast to still further ravage the country. Cepheus, inquiring of the oracle, learned that only the sacrifice of the beautiful Andromeda would appease the wrath of the ocean dwellers. Andromeda, therefore, was chained to a rock on the seacoast to be devoured by the monster. While awaiting her horrible fate, she was seen by Perseus, flying homeward with Hermes' winged shoes, and carrying Medusa's head. Perseus dropped to earth, learned the troubles of Andromeda, slew the monster, and married the maiden. For a time the sea nymphs ceased to harass Cassiopeia. At her death, however, she was given a place among the stars, which angered them anew. Their only recourse was to cause her position in the heavens to be such that in revolving about the pole star, she should hang head downward half the time. This, perhaps, to teach her humility. The constellation Cassiopeia is known as the Lady in her Chair. In charts of the constellations she is represented as a draped figure reclining in a chair and holding up both arms. There are fifty-five stars in the constellation, five of which, forming a capital W, are of the third magnitude. A new star appeared in the constellation in 1572. For a time it

shone as brightly as Venus, then disappeared, and has not been identified since.

> That starred Ethiope Queen that strove
> To set her beauty's praise above
> The sea-nymphs, and their powers offended.
> —Milton.

Cassiquiari, käs-sē-kē-ä′rē, a unique river of Venezuela. It branches off from the upper Orinoco, taking nearly half of the water of that stream, and flows westerly over 100 miles into the Rio Negro, one of the main tributaries of the Amazon. The Cassiquiari is a deep, rapid, navigable stream. With the Rio Negro it forms a continuous waterway between the Amazon and the Orinoco. See AMAZON; ORINOCO.

Cassock, the tight-fitting coat worn under the gown or surplice by clergymen. In the Catholic church the cassock of the priest is black; that of the bishop is purple; of the cardinal, scarlet; and of the pope, white. The name was applied formerly to a loose, outer gown worn over other garments.

Cassowary, a genus of large birds resembling the emu and the ostrich. There are several species, found chiefly in New Guinea, Australia, and intermediate islands. The common helmeted cassowary stands five feet high. It has a crested head and a bare, wattled neck of a deep blue and fiery red color, set off by a large, yellow eye an inch in diameter. The body is draped with soft, dark, hairy plumes from three to fourteen inches long. The wings are short, almost abortive, but are armed with five stiff quills with which it can strike a dangerous blow. The body and legs are stout. A strong foot is divided into three toes each armed with a stout claw, the largest, that of the inner toe, being three and one-half inches in length. The cassowary runs with swift bounds, far outstripping a horse, but, unlike the ostrich, it receives no aid from its reduced wings. It lives in the forests and parks on fruits, seeds, and the eggs of other birds. Its own eggs are green. Those of the largest species are from three to five inches in diameter. They are left in a nest on the ground to hatch, it is said, in the heat of the sun. The birds may be tamed or domesticated. See OSTRICH; EMU.

Cast, a term applied by artists to an impression taken by means of wax or plaster of Paris, of a coin, bust, statue, face, or any other model. Powdered plaster of Paris is mixed into a paste, spread on the surface of the model, and suffered to harden to form a mold. It is then removed, dried thoroughly, and hardened with linseed oil. It may be made in two or more sections, the edges of which should be fitted carefully together. The mold is then filled with plaster of Paris which reproduces the features of the original model. In case of a living face, the eyebrows and hair are first anointed with sweet oil to prevent adhering, and pasteboard tubes are inserted in the nostrils to allow the model to breathe. Plaster casts may be hardened with soap, white wax, rosin, and linseed oil until they resemble marble in appearance and are able to withstand washing to remove dust and grime. See SCULPTURE; CASTING; BELL.

Castanets, a pair of wooden rattles. The name is derived from *castania,* the Latin name for chestnut, from the wood of which castanets are not infrequently made. Castanets are shaped not unlike the two halves of an oyster shell, only they are shallower, and more nearly circular. They are tied together loosely by a string and hung over the thumb, so that they fall within the palm of the hand. When the hand is shaken the castanets strike against the half closed fingers making a tremulous sound. They are played as an accompaniment to the guitar or to mark the time of dancers. It is supposed that their use was introduced by the Moors. They are still in favor among the peasants of Portugal, Spain, and southwestern France. More out of curiosity they have been introduced into English-speaking countries for concerts and the like.

Caste. See BRAHMANS; INDIA.

Castelar, Emilio (1832-1899), a Spanish statesman. A native of Cadiz. He studied at the University of Madrid and became a professor of history in that institution. He was a frequent contributor to various periodicals. At the age of thirty-two he established *La Democracia,* a popular journal devoted, as may be infer-

red from the name, to the advance of democratic ideas. The period was one of military uprisings, of "government by revolt." Ferdinand VII, a suspicious, treacherous, absolute monarch, died in 1833. The Absolute party desired to crown Carlos, a brother of the dead king. The Carlists, as this party was called, were opposed by those in favor of a constitution. The crown was settled on Isabella, a young daughter of Ferdinand, under the regency of her mother, Christina, who proclaimed a paper constitution. Carlos and the Carlist leaders were driven out in 1840; but meanwhile the Constitutionists divided into Moderates and Progressionists and fell to blows. Christina sided with the Moderate party and was forced to abdicate. One military uprising followed another. Any officer who had the troops and a grievance might issue a proclamation and find himself in flight or in charge of the young queen's government, as the event might turn out. These revolutions were little more than armed changes of ministry. There was noise and bluster, but little bloodshed. The common people went on planting and harvesting, reaping their little patches of grain, pulling the flax and hemp, gathering oranges and hazelnuts, pressing wine, and shearing sheep, quite indifferent to the cockade that rode foremost, provided they could pay their taxes and keep bread in the mouths of their children. Forty years of this kind of government went on. Isabella grew up worthless; elections were a farce. As a journalist and public speaker, Castelar strove manfully to bring order out of chaos. His is the one patriotic voice to be heard above the din of selfish strife.

In 1866 Castelar was concerned in an uprising, not against the ministry, but against monarchy, and was compelled to flee to England under sentence of death. Two years later Isabella fled, and Castelar returned. Castelar labored to proclaim a republic, but the supporters of monarchy won in the Cortes and finally the crown was accepted in 1871 by Amadeo, a younger son of Victor Emmanuel of Italy. Two years later the young king gave up in despair, and Castelar became the president of a new republic. The constitution was much like that in vogue elsewhere. Castile, Aragon, and the other ancient provinces were constituted states; but the people proved unfit for self government. It had been the dream of Castelar, the student, and Castelar, the writer, and Castelar, the speaker, and Castelar, the revolutionist, and Castelar, the legislator, to give Spain an enlightened democratic government; but Castelar, the president, could not convert the ignorance of centuries into intelligence, nor the official selfishness and dishonesty of misrule for generations into a progressive and upright administration. He encountered an empty treasury, a demoralized army, officers in mutiny, seaboard cities refusing to comply with national legislation, Carlist uprisings in the north and municipal uprisings in the south, hordes of ruffians in the cities, and bands of bandits in the mountains.

Castelar was forced to abandon theory for practical measures. He saw that "the choice lay between bayonet rule in the hands of disciplined troops controlled by good men, and pike rule in the hands of a vicious rabble led by escaped galley-slaves." During a recess of the Cortes, Castelar made himself dictator. He drove out the Carlists, subdued the cities, and sent criminals to the gallows by the short route of drumhead courts-martial. When the Cortes reassembled, a resolution of censure was passed. Castelar might have turned the legislators out at the point of the bayonet, but he had no personal desire for authority. He resigned promptly. He became a member of the Cortes, rising often from his seat to speak with all his old time eloquence. Castelar is admittedly the Spaniard of his century. His chief writings are *History of the Republican Movement in Europe, Civilization,* and *Questions, Political and Social.*

Castelar was well aware that he had not seen all his hopes bear fruit but he was well content. Toward the close of his life he wrote: "When we turn the eyes of our memory to the sad realities of the past, and compare them with the realities of the present, we see what may be accomplished without the fulfillment of

Utopian dreams and unrealizable ideals. Those who have seen an almost absolute monarchy may today see a democratic monarchy. Those who once scarcely dared to express their thoughts, today may write whatever they think proper. Those who once were excluded from the universities for proclaiming free thought and the proper standards of science, today have a right to teach what they think and believe. Those who once felt their hearts stirred with indignation against slavery and the markets where human beings were bought and sold, as in Nineveh and Babylon, now know that today there is not one slave under the Spanish flag. We may well feel content with the work of the past forty years."

Castile, käs-tēl′, a former kingdom in the central part of Spain. For a long time it was a frontier state,—a line of castles, as the name implies, against the Moors. By the marriage of its queen, Isabella, with Ferdinand, king of Aragon, in 1469, the crowns of Castile and Aragon were united. From this union sprang the modern kingdom of Spain. See MOORS; SPAIN; ARAGON.

Casting, the running of melted metal in a mold so as to produce a piece of metal having a desired shape. Casting is to be distinguished from stamping. Coins, for instance, are struck out of a sheet of metal by a heavy punch, and pressed into form by a die. Casting is done for the most part in foundries. Small castings may be made in trays of sand; but for castings of size a bed of sand, often many feet deep, is spread over the floor of the casting room. Casting sand is fine, free from gravel, and has a faculty of retaining an impression as of a footprint. It must be dried out thoroughly to prevent an explosion through the sudden formation of steam when hot metal is poured into it.

In order to make a casting it is necessary, first of all, to have a pattern, usually of wood, the exact size and shape of the desired object, from which to form a mold. In case of a pattern of plain form, it is thrust simply into the sand bed. The sand is rammed to make it fit up closely and stand firm. The pattern is pulled out and molten metal is poured in from a ladle. In case of a large casting the metal is allowed to run through a gutter from the melting pot to the mold. As soon as the iron begins to harden it is covered with sand so that the cooling may proceed slowly.

A more complex pattern like that for the castings of a school desk, for instance, could not be drawn out without disturbing the sand. For such castings a mold is made by means of two frames called flasks. The first frame is laid on a table, filled level full of casting sand rammed tightly; the pattern is then laid flat on the sand and pressed down till half its thickness is pressed into the surface. An empty frame is then set on the first frame and sand filled in and rammed down as before. A small hole is made through the upper sand reaching to the pattern. The upper frame is then lifted off, bringing its sand with it. The pattern is taken out and the upper frame is set back carefully. If all has gone well, a cavity or mold the exact shape of the pattern has been formed between the sand of the upper and lower flasks. The molten metal is now poured into the cavity through the hole provided for the purpose, and is allowed to cool. The two flasks are then separated and the casting is removed.

Castings may vary in weight from a fraction of an ounce to many tons. A huge iron casting lately turned out in a Pittsburgh foundry measured 26×8×12 feet and weighed 234,000 pounds—117 tons. In case of a hollow casting, such as a kettle or an iron pipe, an inside mold called a core, and an outside mold or jacket, must be made that the iron may be poured in between them. Some notion of the method of producing such a mold may be gained from the article on the BELL.

See CAST; SCULPTURE; IRON; STEEL.

Castle, a strongly fortified residence, such as was occupied by the nobility of the Middle Ages. Castles were a prominent feature of feudalism, and, as such, were built throughout western Europe. It is considered probable that they grew out of the old Roman camp, or defence thrown up for the temporary protection of the

legions; but the castle differed essentially from the camp in that it was a place of residence, as well as a stronghold. The Normans brought the art of castle building to its greatest perfection. One reason why William the Conqueror subdued England so readily was a lack of English fortresses built on the Norman plan.

Castles were, of course, of various sizes and shapes. The smaller were large enough merely for the accommodation of a family, a few domestics, and a handful of men. The more pretentious castles of the war lords were provided with storehouses, stables, and barracks for the accommodation of a small army of men and horses, and were provisioned to withstand a long siege.

Inasmuch as any stone stronghold was called a castle, it is difficult to give a description that applies to all. Castles were perched, if possible, on some rocky eminence,—a river bank, or at least a bit of rising ground. The entire works were surrounded by a deep moat or ditch. The moat was filled with water in time of danger. The site of the castle was chosen often with a view to filling the moat from a nearby stream or lake. The castle of Loch Leven, Scotland, was built on a small island. In case the site was a peninsula, it was necesary to construct a moat across the isthmus only.

Around the inner edge of the moat a high wall of masonry was constructed. Speaking of the Norman castles built in England, this wall was eight or ten feet thick, and from twenty to thirty feet high. The top was wide enough for two or three men to walk abreast. A stone parapet or battlement ran around the outer edge to protect the defenders. Sometimes it overhung, so that stones and molten lead could be dropped on besiegers who undertook to undermine the walls below. It was provided usually with embrasures or gaps, through which arrows, darts, and stones might be discharged upon the besiegers. The lower edge of the embrasure was ordinarily breast high. There were also narrow portholes behind which archers might stand in security. Projecting towers were built at the corners. The moat was crossed by means of a wooden drawbridge, hinged at its inner end. Chains wound on a windlass in the tower enabled the keeper of the drawbridge to pull up the outer end until the platform stood erect, thus making it necessary for besiegers to plunge through the moat in order to reach the castle walls.

The gateway was fortified with great care. There was usually an outbuilding, called a barbican, which must be taken by besiegers before they could reach the gate proper. The roadway was flanked by massive stone towers, united overhead in an arch. In addition to strong folding doors studded with metal, the passage was defended by a portcullis, a heavy frame sliding in grooves in the stonework on either side of the gateway. It was raised by means of a windlass, and could be let drop at a moment's notice. The defenders of a castle sometimes resorted to the dangerous experiment of raising the portcullis and allowing as many besiegers to enter as could be handled safely; then dropping it again. Within this outer wall was an open court, known as the outer bailey. A second wall constructed like the first, only thicker and higher, and pierced by a gateway similarly defended, separated the outer bailey from a second court, known as the inner bailey.

Within the inner bailey stood the keep, a massive four-story stronghold with enormous towers and battlemented walls. The keep of the Tower of London, begun by William the Conqueror, is 100 feet square and four stories high. Its walls are fifteen feet in thickness. The keep of Rochester Castle, also four stories in height, is surmounted by lofty turrets running a story higher. The keep was entered by a single doorway, so small that a few men could repel the attacks of many. The basement, known as the dungeon, or donjon, was used for the confinement of captives. It was without light or ventilation. The first floor of the keep was occupied by soldiers' apartments and a guard room, mess room, etc. It was lighted by very small, narrow windows, easily defended. The second and third floors were provided with larger windows. The state chambers, including the

great dining hall, were situated usually on the second floor; the private apartments of the family and private chapel were on the upper or fourth floor.

In order to take a castle of this type, therefore, it was necessary to pass the moat, gain the barbican and outer doorway, storm the second wall, and lastly to gain possession of the keep, the strongest building of all. Not infrequently the entrance to the latter turned at right angles, or wound upward in a spiral, rendering it easy of defense. Sometimes the floors were built of thick stonework, so that the defenders could retire from story to story, making their last stand on the upper floor. For the want of gunpowder or other explosives with which to blow up stonework, the taking of a strong castle was practically an impossibility. Unless betrayed by treachery, or starved out, a garrison could make good the defense for an indefinite length of time. In addition to wells for the ordinary use of the garrison, keeps of this description were provided sometimes with a central well, surrounded by strong walls, so that water might be drawn only from the upper story. In fact, the keep was the essential part of a castle. Many castles of no little strength had no outer defenses. Sometimes the chapel, barracks, residence portion, and keep formed part of the outer walls.

A sort of glamor surrounds castle life. In reality, however, a castle was a comfortless place of abode. The thickness of the walls prevented the entrance of much light. The interior was gloomy, dark, damp, and poorly ventilated. The inhabitants were subject to neuralgia and many diseases which sanitary precautions now render infrequent. The furniture of the nobility was of the rudest description. The soldiers slept usually in their clothing on straw. Despite gay pennons, uniforms, brilliant trappings, and martial music, the interior of the castle was oftentimes as squalid as the lodge of a typical Indian. It is only in contrast with the wretched huts of the village, usually found at the foot of the castle hill, that the castle itself can be accounted a desirable place of residence. Things often seem better by contrast.

As stated, castles in various states of preservation are to be seen all over Europe. Ruined castles may be seen by the score from almost any railway train. A locality without its ivy-covered castle walls is lacking, indeed, in historical associations. The Danube and the Rhine, especially the banks of the latter, are noted for magnificent castles. Special articles may be found on WARWICK, KENILWORTH, TOWER OF LONDON, WINDSOR, EDINBURGH and DUMBARTON. Sir Walter Scott has made much of the castle. "Norham's castled steep" and "Tantallon's towers bold" are described in the first, fifth, and sixth cantos of *Marmion*. A description of Front-de-Boeuf's smaller castle may be gleaned from chapters xxi-xxx of *Ivanhoe*.

See FEUDALISM.

Castor and Pollux, in Greek and Roman mythology, twin sons of Leda, wife of Tyndareus, and Zeus, who was said to have wooed Leda in the form of a swan. In Homer they are represented as sons of Leda and Tyndareus and brothers of Clytemnestra and the beautiful Helen of Troy.

Castor was famous for his skill in taming and managing horses; Pollux for knowledge of boxing and wrestling. The brothers were devotedly attached to each other and were inseparable companions in many adventures. They were among the heroes of the Argonautic expedition. On the voyage a terrible storm arose. While all were calling on the gods for assistance, two stars suddenly appeared above the heads of Castor and Pollux. The storm immediately subsided and thereafter the twin brothers were regarded as the special guardians of seamen. On their return from this expedition the brothers found that their sister Helen had been carried off by Theseus. They went to her rescue and were successful in bringing her home again.

According to another account Pollux only was the son of Zeus. He was therefore immortal; but Castor, the son of Tyndareus, was mortal. The brothers became involved in a quarrel with Idas and Lynceus. Castor was slain, and Pollux, inconsolable, besought Jupiter to allow him to die too, unless Castor might share his

immortality. Zeus consented that the two might divide their time between the lower world and the abodes of the gods.

Still another story is that Zeus rewarded their fraternal affection by giving them a place among the stars. The two bright stars in the constellation Gemini, or "The Twins," are known as Castor and Pollux.

The brothers received divine honors, especially among the Dorians. They were called Dioscuri, Sons of Jove. It was believed that in time of battle or great peril they occasionally appeared to mortals mounted on magnificent white steeds, clad in shining garments, and with stars above their heads. It is thus they are represented in ancient art.

The electric flames sometimes seen to play about the masts of vessels during storms are often called Castor and Pollux. If only one flame appeared, the Romans called it Helen, and prophesied a continuation of the storm. If two flames were seen they were called Castor and Pollux, and boded a cessation of the storm. These lights are also called St. Elmo's fire. See St. Elmo's Fire.

The names Castor and Pollux are of frequent occurrence in literature. In Acts xxviii: 11, we find St. Paul embarking in a ship named Castor and Pollux.

But when the sons of Leda shed
Their star-lamps on our vessel's head,
The storm-winds cease, the troubled spray
Falls from the rocks, clouds flee away,
And on the bosom of the deep
In peace the angry billows sleep.—Horace.

So like they were, no mortal
  Might one from other know;
White as snow their armor was,
  Their steeds were white as snow.
Never on earthly anvil
  Did such rare armor gleam,
And never did such gallant steeds
  Drink of an earthly stream.
. . . . . .
Back comes the chief in triumph
  Who in the hour of fight
Hath seen the great Twin Brethren
  In harness on his right.
Safe comes the ship to haven
  Through billows and through gales,
If once the great Twin Brethren
  Sit shining on the sails.—Macaulay.

Castor Bean, or castor oil plant, a handsome, stately plant, a native of southern Asia or northern Africa. In tropical countries it becomes a woody plant reaching a height of thirty feet, but in north temperate countries the bean is planted from seed in May, reaches a height of from three to fifteen feet during the summer, and wilts at the first suggestion of frost. The castor bean is a plant of remarkable growth. In 1907 Oscar Smith of Great Bend, Kansas, grew a plant 180 inches high in 150 days. The total breadth of the plant was 196 inches; the largest leaf measured 36 inches in diameter. The plant bore 347 leaves 6 inches or more in width. Quick growth, colored stems, broad purple leaves from six to thirty inches in diameter, and long racemes of yellowish flowers, make the castor bean a showy, desirable plant for decorative purposes, especially in the center of a mass of foliage plants in a park or other extensive grounds; but it is too large and coarse to commend itself to florists. The fruit is a burr-like pod containing three oval seeds, or beans, from which the castor oil of commerce is obtained. Castor oil plants are raised for commercial purposes in India, France, Spain, Brazil, the West Indies, and the United States. Illinois and Missouri raise seed enough to make St. Louis quite a center of oil production. The best quality of oil is obtained by crushing the seeds cold. It has a light yellow color. It is a thick, smooth oil, almost as heavy as water. In addition to its use as medicine, castor oil is considered the best of oil for sewing machines, lawn mowers, buggies, and all machinery for which it is not too expensive. It is also suitable as a dressing for fine leather, and is recommended for expensive shoes, carriage tops, and costly harness. See Medicine; Oil.

Cat, a family of animals including the lion, tiger, panther, lynx, and wildcat. Of all domestic animals the common house cat retains the greatest number of wild characteristics. It has never been tamed completely. It cannot be subdued by punishment, and, although attached to the fireside, it pines and dies in captivity. It seems to be very like some wild ancestor, and yet its origin is unknown. Domesti-

Nubian cat.

Wildcat of Old World.

Angora cat.

CATS.

cated animals are usually larger than their wild relatives; but the domestic cat is smaller than any known wild cat. Cats differ so that it is thought probable that they represent more than one forest cat of Europe and Asia, perhaps now extinct.

The cat is preëminently a hunter. It has a large, broad head, and a comparatively slender body, able to follow wherever the head can go. It has long whiskers or feelers on the sides of its face, calculated to assist its noiseless passage amid bushes or other obstructions. The pupil of the eye of the cat contracting or expanding in a marked degree adapts itself to varying degrees of light. That is why the cat can see as well at night as by day. The tongue is provided with rough, tooth-like projections that slant backward, giving it a rasping surface. The cat has five long, sharp claws on the front foot, and four on the rear. Each claw is hung on a peculiar joint, and is controlled by a pair of muscles. The under muscles draw the claws into position for striking and holding prey; while the upper muscles draw the claws upward and backward into little pockets in the ends of the toes, so that their owners can step softly on the ball-like projections of the foot. The cat has a remarkably lithe, powerful body, endowed with great endurance, giving rise to the proverbial expression that "a cat has nine lives."

Unlike the mink, the otter, and many other flesh-eating animals, the entire cat family shuns water. The fur is devoid of oil, and is, in consequence, naturally free from disagreeable odors. The cat is an exceedingly affectionate mother, and has a very amusing way of carrying her young about by the nape of the neck. The kittens are exceedingly frolicsome, giving rise to a Scotch proverb often offered mothers who are worrying about their wayward children, "A wanton kitten aye makes a douce cat."

Cats are usually classified as long-haired and short-haired, the former including the Siamese, Persian, and Abyssinian cats. The tabby cat, a term somewhat misunderstood, is applied to any cat having a light ground color with darker stripes, bars, or spots. Thus a yellow cat with orange red markings, or a gray cat with black markings, is a tabby. The term is derived from the name of a watered silk, which in turn had its name from the street of Atab in Bagdad, noted for its silk manufactures.

The service of the cat to the agriculturist is hardly appreciated at its full value. Although long recognized as a famous mouser and inveterate foe of rats, few realize that, without the assistance of the cat, it would be exceedingly difficult to raise or store food in the grain producing countries. Rats and mice, to say nothing of squirrels, multiply with such rapidity that they would devour not only grain in the fields but the grain in mills and elevators. We are sometimes provoked with the cat for disturbing the nests of innocent birds; but this offense is far more than offset by its service in protecting the food supply of mankind.

The Egyptians, who lived in what was called the "granary of the world," are said to have recognized the value of the cat at an early date. At all events the cat was carefully protected and even reverenced. Temples were erected in its honor. The members of the household shaved off their eyebrows as a sign of mourning when the cat died, and its mummied remains are found along with those of princes and priests.

It is said that the cat is wholly selfish in its actions, without affection for the members of the household. However that may be, the cat has long been a favorite companion, holding first place among pets. Robinson Crusoe, it will be remembered, was exceedingly attached to a cat. On the other hand, during the New England witchcraft craze, cats were considered the familiars of witches. Satan was supposed to communicate with his dupes by taking the form of a black cat.

The term cat has been applied variously. The cattail is a tall, aquatic herb, with sword-like leaves and a central stem, terminating in a cylinder of fuzzy seeds, something like a cat's tail. The cat-o'-nine-tails is a cruel whip of nine lashes, formerly used on British men-of-war. A cat-and-dog affair is a state of permanent

hostility on a small scale, like that existing between the cat and dog. It is difficult to say just how the expression, "it rains cats and dogs," originated. To "let the cat out of the bag" is to divulge a secret, while, "a cat may look at a king," is expressive of the fundamental equality of man.

See LION; TIGER; COUGAR; LYNX.

Catacombs, kăt′ȧ-kōms, subterranean burial vaults. The custom of depositing the dead in cavern-like passages excavated in rock appears to be widespread. Catacombs have been found in Phoenicia, Asia Minor, on the coasts of Africa and Cyprus and Syria, Persia, Upper Egypt, Sicily, and elsewhere. Even the Aztecs of Central America deposited bodies, perhaps to the extent of millions, in rocky caverns which they enlarged and extended for the purpose. Abraham, it may be remembered, bargained with the children of Heth for the cave of Macpelah in which to bury his dead.

The most extensive catacombs known are those excavated by the early Christians in the tufa or volcanic rock underlying the Campagna, or plain, near the city of Rome. The Romans cremated, but the Christians adopted the Jewish mode of burial. These catacombs were made by the early Christians as a place of burial, but came also to be used for refuge. Chapels and places for holding public worship were excavated in connection with them. The total length of the passages is from 350 to 900 miles. It is thought that they contain the bones of over 6,000,000 people. Many chambers, or vaults, are arranged along the sides of the passages. Those of important families appear to have been marked with slabs of stone bearing suitable inscriptions.

Extensive catacombs are also found near Naples, and underground at Cairo. In excavating the stone of which the principal buildings of Paris are constructed the quarrymen extended their works to great distances beneath the surface of the city, leaving pillars to uphold the roof. When it became desirable to use the church cemeteries within the city for other purposes, the bones were collected and deposited in these old quarries, and they became places of burial. It is said that the catacombs of Paris contain several times as many people as now dwell within the city. Visitors accompany the officials on their periodical visits of inspection.

Catalina Island, an island of the Santa Barbara group about twenty miles west of Los Angeles harbor, California. It is about twenty miles long and from one to nine miles wide. The island is noted for its fine climate, beautiful submarine gardens and excellent bathing beach, and it is a favorite resort for tourists. The surrounding waters have been made a fish reservation by an act of the California Legislature and the tuna fisheries have become important. It is the scene of annual fishing tournaments.

Catalpa, kȧ-tăl′pȧ, a genus of deciduous trees, found in the northern hemisphere and belonging to the trumpet-creeper family. There are seven or eight species, four of which are hardy in temperate regions. The species best known in the United States flourishes from New England southward. A second species, the showy catalpa, is native from southern Illinois and Indiana to the Gulf. It is cultivated as a park tree as far north as central Minnesota. In southern latitudes it grows to be a tree 100 feet in height. The leaves are broad and heart-shaped at the base. The flowers are tubular, bell-shaped, and two-lipped, with a total spread of about two inches. They are showy and are succeeded by long ornamental pods that hang on during the winter time. The wood is soft and close grained, but it is as durable as that of the walnut and chestnut. Catalpa fence posts are known to have lasted eighty-five years. The wood is light and is worked easily. It does not check in drying. The Indians of the Ohio Valley are said to have preferred a catalpa log to all others for canoe making. Experts in forestry recommend catalpa planting for wood lots. A thrifty young tree is large enough for a fence post at the age of fifteen years, and large enough for a railroad tie at twenty. Several railroad companies are said to be setting out catalpas for ties. The catalpa may be propagated by seeds and by cuttings.

Catamaran′, a sort of raft. The original catamaran is an invention of the natives of Madras, Ceylon, and other Indian coasts. It consists of three logs lying side by side. The central log is longer and much larger than the two others, and is pointed at the ends. Holes are bored through the logs and all three are stoutly lashed to crosspieces. The logs chosen are light and full of pitch, which prevents their becoming watersoaked. The raft is from twenty to twenty-five or thirty feet long, and perhaps one-fifth as wide. A sail is not infrequently rigged up. The natives use the catamaran as a surf boat. As it cannot tip over or hold water it rides like a duck when other boats would fill and sink. Passengers who do not fear a drenching are conveyed safely to shore or ship through surf that would swamp a boat. The catamaran of American lakes is constructed usually on slender, oblong, water-tight boxes instead of logs. Like any other raft it affords no protection against drenching, but is considered a safe sort of craft for boys who enjoy the water. See BOAT.

Catapult, a Roman engine of war. Although we use the expressive phrase, "shot from a catapult," we have no exact description at hand. Makers of cuts have conjectured that a powerful bow was drawn by winding up a windlass and let go by slipping some sort of a catch. By this means bolts or arrows were hurled with great force. Large catapults requiring the strength of several men were used in besieging walled cities. This before the invention of cannon. They were capable of throwing a six-foot sixty-pound wooden bolt, to a distance of 400 yards. Small catapults were carried by single soldiers. On the whole the catapult seems to have been built on the principle of a bow and arrow.

Cataract. See YOSEMITE; NIAGARA; VICTORIA; WATERPOWER.

Cataract, a disease of the eye, in which the crystalline lens gradually becomes opaque, resulting in partial or total blindness. The name is said to have come from the belief of the ancients that a veil or film fell down inside the eye, cutting off the sight. A dimming in vision and a change in color of the pupil, usually to white, marks its onset. No medical treatment avails, but skilled surgeons may remove the lens so that with proper spectacles sight is partially restored. Cataract is fortunately painless and is unusual except in elderly people.

Catarrh, kȧ-tär′, in medicine, an inflammation of the mucous membrane that lines the air passages of the head and throat. The membrane throws off an offensive discharge of matter freely. Catarrh differs from diphtheria in that the surface of the membrane is not destroyed, nor does it become covered with patches of false growth. Like bleeding, catarrh is not a disease; but it is a symptom of some general cause—some general disorder of the mucous membrane. It arises frequently from a severe cold. Inflammation of the mucous membrane of the stomach or other tubular organs may also occur, and is also termed catarrh. See DISEASE.

Catawba, kȧ-taw′bȧ, in horticulture, an excellent variety of cultivated grapes. This grape originated from the fox grape of the Catawba River in the Carolinas, from which locality it takes its name. The Catawba grape was brought to perfection by Mr. Longworth in a vineyard on the hills of Cincinnati. It is of a red, coppery color. In size it is midway between a Concord and a Delaware. The growers of the Ohio Valley are partial to this grape, which they send to the market in five and ten pound baskets. It is considered an excellent wine grape. See GRAPES; MUTATION.

Catbird, a well known slaty-gray bird with black crown and tail. About nine inches in length. It is related to the wren, the brown thrasher, and the mocking bird, the latter of which it resembles not a little. It ranges from Hudson Bay to the Gulf, nesting in dense thickets and closely foliaged trees. Three to five eggs, greenish blue. The catbird is intensely distressed when her nest is discovered. Mrs. Olive Thorne Miller gives the catbird a high reputation for hospitality and charitable behavior toward its unfortunate neighbors,

feeding the hungry and distressed like a good Samaritan; but Lowell speaks of catbirds as "weasel Scots," that from their home in a syringa bush, tore down the unguarded nests of their neighbors. The catbird is a fine singer, performing late into the night; but it demands prompt payment in raspberries and other small fruits in sufficient quantities for self and fledglings. See MOCKING BIRD.

Catechism, kăt′e-kĭzm, a pamphlet or volume of religious instruction put in the form of question and answer. The Roman Catholic catechism was put forth in Latin by the Council of Trent in 1556. It has been translated into various modern languages. The first English translation appeared in 1829. The *Westminster Shorter Catechism,* drawn up by a meeting of Presbyterian divines at Westminster in 1647, is taught by the Church of Scotland and Presbyterians generally. It was long taught by the Congregationalists of New England. An abridgment is the *Shorter Catechism,* embalmed in literature as far from a delight to children. The catechism written by Martin Luther is taught in Lutheran parochial schools the world over. The catechism of the Church of England has been a manual of instruction for centuries. Other denominations, notably the Methodists and Baptists, have each a catechism. The Protestant dissenters of England were attached to Dr. Watts' catechism.

Catechu. See ACACIA.

Caterpillar. See INSECTS.

Catfish, a family of marine and freshwater fishes including 900 species. As a family they are sluggish, feeding generally in the mud of streams. Some of them are good for food, and all are tenacious of life, living out of water or in the mud of dried up ponds for an astonishing length of time. The body is without scales. The mouth is usually surrounded by feelers. The first ray of the forward fins is extended into a sharp spine which inflicts painful wounds. Of North American species, we have two sea catfishes of a dusky bluish color along seashores from New York to Texas. The three-foot channel-fish, olivaceous in color, with silvery sides and a large eye, is an excellent food fish. It is found in streams from Vermont to Montana and southward to the Gulf. The steely blue Mississippi cat is larger and stouter than the preceding, reaching a weight of 100 pounds. The best known catfish is the common bullhead or horned pout, found in muddy bottoms of ponds and streams everywhere. It can make a living after all other fish, even the pickerel, have been destroyed. It is a nuisance to the angler for perch, wall-eye, or bass. Thoreau has noted its ways well.

The horned-pout is a dull and blundering fellow, fond of the mud. It bites deliberately as if about its business. They are taken at night with a mass of worms strung on a thread, which catches in their teeth, sometimes three or four, with an eel, at one pull. They are extremely tenacious of life, opening and shutting their mouths for half an hour after their heads have been cut off. A bloodthirsty and bullying race of rangers, inhabiting the fertile river bottoms, with ever a lance in rest, and ready to do battle with their nearest neighbor.—*A Week.*

Catbird (see preceding page.)

Catgut, a sort of string prepared from the intestines of sheep and other animals,

never those of a cat. The *Century Dictionary* suggests that the word may have been kitgut, "kit" meaning a violin, and that the change to catgut may have come about from a careless confusion of kit and cat. The intestines are cleansed very thoroughly, steeped in water, and all fatty matters removed. The external membrane is scraped away with a dull blade, and the clean gut is then drawn through a perforation or twisted into shape and dried. The best gut is prepared in Milan and Naples. The poorer the animal, the less fat to be removed from the intestines, the better the string. Catgut is exceedingly tough, flexible, and durable. Catgut is used extensively for the strings of violins, harps, and other stringed instruments. It is used also by clockmakers for weight cords in high grade clocks. In 1868 Dr. Lister, a professor of surgery in Glasgow, the same from whom listerine takes its name, discovered a new use for catgut. Prior to this time surgeons used silk thread to tie arteries. They depended on the final decay of the silk and its absorption by the system. Sometimes the silk rotted too soon, that is, before the artery had fully united, in which case the artery broke open and required to be retied; and, in any case, the rotting silk formed an objectionable spot of foreign matter; Dr. Lister used catgut instead. He found that a bit of properly sterilized catgut tied about a cut in an artery turns into artery wall. See SURGERY.

Catharine I (1684-1727), empress of Russia. She was the daughter of a Roman Catholic peasant, and became the Lutheran wife of a Swedish dragoon. When Marienburg was stormed in 1702 she fell into the hands of one and then another Russian officer; finally becoming the mistress, then the wife, and lastly, in 1724, such was her influence, the empress of Peter the Great. In 1711 she rendered her husband signal service in a war with the Turks. He was on the brink of destruction when she obtained an influence over the grand vizier, bribed his servants with her jewelry, and secured better terms for Peter than he had any reason to expect. Prince Menshikoff, whom she met before Peter saw her, stood her friend, and on Peter's death had her proclaimed empress and autocrat of all the Russias. Catharine was an unprincipled, profligate adventuress, but she did much for Peter and much for Russia. She died, it is said, in a tipsy debauch. She could neither read nor write.

Catharine II (1729-1796), empress of Russia. She was a severely educated German princess selected for the wife of Peter III, to whom she was wedded in 1745. He proved a weak, dissolute prince, unfaithful to his wife. The Orloff family shut him up in prison and proclaimed Catharine autocrat in 1762. Peter died soon after under suspicious circumstances —strangled by the Orloffs, it was said. Catharine was doubtless an unprincipled, licentious woman, but she ruled for over thirty years with an ability second only to that of Peter the Great. The latter declared that the Baltic and the Black Sea were the eyes through which Russia must look out upon the world. Peter secured the Baltic eye and Catharine led the Turks a rough life until she had secured the Black Sea eye. She formed an alliance with Frederick the Great. She was a party to the division of Poland, and obtained quite a section of Polish territory. By correspondence with Voltaire and other eminent men she won a reputation as a friend of literature. Aside from extending the bounds of Russia, Catharine saw that roads were built, canals dug, towns founded, commerce extended and protected. Under more liberal laws farmers were protected in the enjoyment of their crops and business prospered. More would have been accomplished had not the French Revolution broken out. It gave Catharine and her friends an idea that education and privileges make people dissatisfied—a notion still too prevalent among the Russian aristocracy. Thomas Carlyle called Catharine a female Louis XIV. See POLAND; KOSCIUSKO; PETER THE GREAT; FREDERICK THE GREAT.

Catharine of Aragon (1485-1536), queen of England and wife of Henry VIII. She was the youngest daughter of the Ferdinand and Isabella of Spain in whose reign Columbus discovered America.

CHARLES IV AND CATHERINE DE MEDICI AFTER THE MASSACRE OF ST. BARTHOLOMEW

From the Painting by E. Debat-Ponsan

In 1501 she married Arthur, son of the king of England. On the death of this prince, the king, desiring, it is said, to retain her money, caused her to marry his second son, who afterward became Henry VIII of England. The Pope granted a dispensation, as required for wedding a husband's brother, and Catharine and Henry ascended the throne of England together in 1509. See HENRY VIII; ANNE BOLEYN; MARY I.

Catharine de Medici (1519-1589), queen of France. She was a daughter of Lorenzo de Medici of Florence and a niece of Pope Clement VII. In 1533 she married Henry, son of Francis I of France. She came of a family noted for ability and intrigue, and is considered one of the worst of the family. She, more than any other, involved the Protestants and Catholics of France in destructive factional warfare. She was a Catholic, of course, but appears to have been quite ready to betray friend or foe, as might seem to advance her own interests. She is responsible for the terrible massacre of St. Bartholomew, perpetrated in the reign of her son, Charles IX. In spite of her reputation for political intrigue, Catharine was a woman of elegant manners and refined tastes, a patron of literature, sculpture, and painting. See COLIGNI; HUGUENOTS.

Cathedral, the chief church of the diocese, the church in which the bishop has his chair or seat. From the fact that the bishop's church is likely to be a wealthy church, we have become accustomed to expect a grand building. As a matter of fact, a cathedral may be a lonely hut in a remote missionary field. Moreover, the bishop's cathedra or chair may be removed from one church to another, or from one town to another, just as a king may change his capital. So far as this article goes, it may be regarded merely as a description of the important and dignified church buildings for which western Christianity has been noted.

The early cathedral differed little from the oblong, rectangular Roman basilica or hall of justice. The famous Cathedral of Worms is considered an excellent example of a church half way between the early basilica and the later styles. One of the earliest and the most significant changes was the alteration of the ground plan by giving it the form of a cross, symbolical of the Christian religion. This was effected by building a second rectangle or transept across the first.

The ground plan of a typical cathedral has, first of all, the shape of a cross. The parts may be of varying length and width, but the cross is the controlling idea. The Cathedral of St. Mark at Venice is nearly square. Others have a long nave and short transepts, but the cross is still the predominant feature. At the head of the cross is the choir. It projected eastward not only toward the rising sun, but, in western Europe, toward the sepulcher of Christ. This gave rise to the terms east, west, north, and south as used by architects. The west portal is opposite the choir, and the north and south transepts are on the left hand and on the right hand respectively, as one walks through the nave from the west portal toward the choir. The roof of the nave was usually much higher than the aisles, giving opportunity for a clerestory and windows, and creating the impression of vast spaciousness. Galleries ran around the nave above the aisles, increasing the seating capacity of the edifice. In many churches, at least, the north aisle was set apart for men and the south for women.

In the old basilica the nave was sometimes left uncovered, but the Christians put on a roof. Towers were built to carry chimes of bells, and spires were added, pointing heavenward. The round arch of the Romans grew into the high arch of the Normans, and the latter into the pointed arch. From an architectural point of view, the most celebrated cathedrals are of the pointed style, known popularly as Gothic. The French, English, and Germans,—the Roman Catholics everywhere,—excelled in the construction of these churches.

The earlier cathedrals were decorated in paint and stucco. Christ wearing his crown of thorns, or bearing his cross, was a central thought. Favorite symbols were the lamb, emblematical of Christ; the dove, symbol of the Holy Ghost and of

mildness and gentleness; the heart, symbol of Christian longing; the peacock, bird of immortality; the phoenix, sign of the resurrection; the olive leaf, used as the sign of peace; the palm leaf as the reward of martyrdom; and the anchor and lyre as emblems of Christian confidence and joy. The Old Testament was drawn upon for scenes illustrative of the Bible story of Adam and Eve, Cain, Abel, and Abraham, Noah and the ark, Daniel in the den of lions, and Jonah swallowed by a whale.

Later the carver executed wonders in wood, and later still the sculptor's art created decorations in stone. The older cathedrals, with solid round arches and painted wall decorations, have an air of solidity and repose. The great pointed cathedral is instinct with life and yearning and aspiration. Though built of stone, from foundation to the topmost point of spire and pinnacle, it rises into the air with energetic lightness and the grace of frost work. The spires, rib-like walls, flying buttresses, sculptured portals, pillars, forest-like aisles, galleries, stained glass, rich altars, and intense reverent atmosphere of a pointed cathedral produce an effect that is not approached by any other form of architecture.

The most celebrated American cathedrals are those of Baltimore, New York, Mexico, and Montreal. The Protestant Episcopal diocese of New York is erecting an edifice designed to be the most ambitious structure of the sort in the New World. It is to cost $10,000,000 and to be fourth in size among the world's sanctuaries. The general style is Romanesque. It depends for effect on a large vaulted and domed central area rather than on long pillared vistas.

The Gothic church plainly originated in a rude adaptation of the forest trees with all their boughs to a festal or solemn arcade, as the bands about the cleft pillars still indicate the green withes that tied them. No one can walk in a road cut through pine woods, without being struck with the architectural appearance of the grove, especially in winter, when the barrenness of all other trees shows the low arch of the Saxons. In the woods in a winter afternoon one will see as readily the origin of the stained glass window, with which the Gothic cathedrals are adorned, in the colors of the western sky seen through the bare and crossing branches of the forest.—Emerson.

Catherwood, Mary Hartwell (1847-1902), an American novelist. She was born in Luray, Ohio, and died in Chicago. Her education was received at the Granville Female College. The romantic side of American history has furnished material for most of Mrs. Catherwood's novels. Although not her earliest novel, *The Romance of Dollard* was the first to bring fame to its writer. Other volumes worthy of mention are *The White Islander, The Days of Jeanne D'Arc, Old Kaskaskia, The Lady of Fort St. John,* and *Lazare.*

Cath'ode Rays, a phenomenon resulting from an electrical discharge within a vacuum tube from which all but about one millionth of the air has been removed. The platinum wire by which the electricity enters the tube is called the anode, and where it leaves, the cathode. It is from the latter that these peculiar rays seem to come, causing the glass to shine with a green phosphorescent light. These rays travel in straight lines, cast shadows, and are capable of being deflected by a magnet, which has led to the belief that they are streams of minute particles. Though observed some years previously, it is to Crookes, who in 1876 called them to the attention of scientists, that we are mainly indebted. While cathode rays are not so important in themselves, they have the peculiar power, when they strike the walls of the vacuum tube, of setting up another kind of radiation known as X-rays. See CROOKES; X-RAY.

Catholic Church, The, in its largest sense the entire body of Christian believers; in a restricted, but ordinarily accepted sense, the Church of Rome; those who recognize the see of Rome, that is to say, the pope, as the head of the church. It is impossible to condense the doctrine of the greatest church on earth into a few lines. A full discussion must recognize four cardinal points of belief: the supremacy of the pope or a belief in his full authority in matters of faith and morals; the right of the church to say what the Scriptures mean; the sacrament of confession and penance as a divinely appointed way to ob-

Cardinal Dougherty

Cardinal Farley

Pope Benedict XV

Cardinal Gibbons

Cardinal O'Connell

THE BURIAL PLACE OF AN IMPERIAL FAMILY

HADRIAN'S TOMB, ROME

This circular mass of masonry was built in 136 A. D.

SAINT PETER'S CHURCH, ROME

The largest Christian church in the world, dedicated in 1626. Its beauty reveals the genius of the greatest of its architects, Michelangelo.

tain forgiveness of sins; and the direct line of apostolic succession or priesthood derived through the apostles from Jesus Christ himself.

As to its practical teachings, the most important are: equality of prince and peasant, regardless of nationality or color; the wickedness of human slavery; the duty of priesthood to refrain from marriage; the doctrine that marriage may not be cancelled by divorce, "What God hath joined together, let no man put asunder"; the sanctity of human life, "Thou shalt not kill"; the duty of providing for the unfortunate, as by hospitals and asylums. The latter end is attained largely by voluntary associations of men, called monks, and women, called nuns, who withdraw from the world, refrain from marriage, and devote their lives to works of mercy and charity.

At the beginning of 1922 the estimated Christian population of the world was 564,510,000, and about half of this number, or 272,860,000 were members of the Roman Catholic Church. The estimated Catholic population of Europe in this year was 190,000,000, while about 70,000,000 Catholics were resident in North and South America. Those European countries that are touched by the Mediterranean have the largest Catholic populations, while the northern countries, notably Norway and Sweden, have the least.

The Catholic census figures for the United States in 1922 are interesting. In that year there were 16,615 Catholic churches, 22,000 priests and about 18,000,000 adherents. The total number under the flag of the United States is approximately 24,000,000. The latter count includes, besides the United States proper, the Hawaiian Islands, the Philippine Islands, Alaska and Porto Rico. In 1922 the parochial schools of the United States proper numbered 6,258 and were attended by 1,852,498 pupils.

New York leads the states in Catholic inhabitants, and is followed, not very closely, by Pennsylvania. In the following states Catholics outnumber Protestants: Arizona, California, Colorado, Connecticut, District of Columbia, Illinois, Louisiana, Maine, Massachusetts, Michigan, Minnesota, Missouri, Montana, Nebraska, Nevada, New Hampshire, New Jersey, New Mexico, New York, North Dakota, Ohio, Oregon, Pennsylvania, Rhode Island, Vermont, Washington, Wisconsin and Wyoming. From this it will be seen that the stronghold of the Catholic Church in the United States is in the North.

In the United States there are two cardinals, seventeen archbishops and ninety-three bishops. There are 113 seminaries, 222 colleges for boys, 718 academies for girls, 113 homes for the aged and 304 orphan asylums.

The archidocese of New York with a Catholic population of 1,473,000 outranks the archdiocese of Chicago, which has 1,150,000. The archdiocese of New York does not include Brooklyn, which is a separate diocese with 821,337 adherents. The archdiocese of Boston has 900,000; the diocese of Pittsburgh, 550,000; the archdiocese of Philadelphia, 719,759; the diocese of Newark, 598,143; the diocese of Hartford, Conn., 545,147; the archdiocese of St. Louis, 425,692; the archdiocese of San Francisco, 364,826; and the diocese of Cleveland, 454,019.

New York has the largest number of priests, 1,141; Chicago has 1,066; Philadelphia, 828; Boston, 784; Pittsburgh, 623; St. Louis, 598; Baltimore, 565; Brooklyn, 587; and San Francisco, 447. New York has 395 Catholic churches; Pittsburgh has 384; and Chicago has 363.

Besides the secular clergy, there are some forty religious orders of priests represented in the United States, the principal ones being Jesuits, Capuchins, Paulists, Oblates, Benedictines, Dominicans, Holy Cross Fathers, Franciscans and Redemptorists. There are also representatives of more than a hundred sisterhoods engaged in teaching in the country.

The following passage is taken from Macaulay's brilliant essay on *Ranke's History of the Popes:*

"There is not, and there never was on this earth, a work of human policy so well deserving of examination as the Roman Catholic Church. The history of that Church joins together the two great ages of human civilization. No other institution is left standing which car-

ries the mind back to the times when the smoke of sacrifice rose from the Pantheon, and when camelopards and tigers bounded in the Flavian amphitheatre. . . .

Catholic University of America, an institution for higher education at Washington, D. C., under the supervision of the Roman Catholic church in the United States. It received its constitution from Pope Leo XIII in 1887, and was opened for instruction in 1889. It offers courses in theology, law, philosophy, letters, sciences and engineering. The school of philosophy includes the departments of history, education, sociology and economics. In 1911 a teachers' college was opened for Catholic Sisters engaged in teaching. The university was founded to provide training for the various professions and to offer graduates from Catholic colleges opportunity for original research. It is the highest educational institution under the direction of the Roman Catholic church in the United States. The faculty numbered 94 and there were over 1,904 students in 1922. Cardinal Gibbons was Chancellor from the foundation of the university until his death.

Catiline (108-62 B. C.), a Roman senator. He was descended from a patrician but impoverished family. In politics he was an adherent of Sulla. He held various public positions, including that of praetor and governor of Africa. In 66 B. C. he desired the consulship, but was defeated.

Catiline was a man of depraved morals, intemperate habits, and of inordinate ambition. He surrounded himself with a coterie of young nobles who were noted for gambling, drinking, and every sort of debauchery. He formed a conspiracy to overthrow the authority of the Senate and place himself and companions in authority. Fulvia, a mistress of one of the conspirators, revealed the plot to the consul Cicero, who immediately set spies at work to ferret out the details. November 8th, after hostilities had actually been begun in the provinces, Catiline had the audacity to take his regular seat in the senate, whereupon Cicero turned upon him with the famous Catilinian oration, beginning "How long, now, O Catiline, will you abuse our patience?" To the astonishment of Catiline, Cicero went on to lay before the senate the innermost details of the plot. Catiline arose with haggard face and bloodshot eye. He made a miserable shift to reply; then, with curses on his lips, he turned with unsteady step and left the chamber. He hurried from Rome to join his forces in Etruria. Lentulus and others of the conspirators who remained in Rome to gather intelligence were arrested and executed as traitors. The consul Antoninus was sent against the forces of Catiline. Catiline fought with desperate bravery at the head of his troops, but was defeated and slain.

See SALLUST; CICERO; IBSEN.

Catlin, kăt'lĭn, **George** (1796-1872), an American writer and painter. He was born at Wilkesbarre, Pennsylvania, and died at Jersey City, New Jersey. He set up at Philadelphia as a portrait painter. He traveled extensively among various tribes of American Indians,—no less than forty-eight it is said. He exhibited Indian sketches in Europe and subsequently conducted three parties of Indians in full costume from city to city of the Old World. His chief written work is a finely illustrated two-volume account of *The Manners, Customs, and Condition of the North American Indians.* Over 500 original portraits and sketches are preserved in the National Museum at Washington, D. C. Future writers will owe much to Catlin for his descriptions and illustrations. See INDIANS.

Catnip, or **Catmint,** a mint-like plant. It is an immigrant from Europe, now quite at home in rich, shady spots around farm buildings and under pasture fences. It has a square stem, soft, hairy, heart-shaped leaves, and a white, deeply two-lipped flower, dotted with purple. Catnip tea is a standard remedy for a cold or colic. A bunch of catnip keeps company with boneset in all old-fashioned attics worth the name. A closely related creeping plant is often called ground ivy. See MEDICINE.

Cato (234-149 B. C.), a Roman statesman, surnamed "the Censor" and "the Wise." He served with Fabius during the invasion by Hannibal. He held a number of public positions. He was praetor in

command of Sardinia, served as consul, and did his best to keep a law on the statute books requiring women to dress in plain colors and to wear little or no jewelry. By such an attitude, and by inflexible honesty, he became popular with the people and was made censor, an office designed to amend whatever seemed to be going wrong. Some one asked him why a statue had not been erected in his honor. Cato replied, "I would rather have it asked why no image has been erected to Cato than have it asked why one had been set up." After the Second Punic War Cato was sent on an embassy to Carthage, and returned so astonished by its rapid recovery and its wealth, that he sought every opportunity to admonish the Roman senate of the danger of allowing so powerful a city to remain, ending every speech with the words now become proverbial, "Carthage must be destroyed." See SCIPIO; CARTHAGE.

Cato the Younger (95-46 B. C.), a Roman general and statesman. He was a great-grandson of Cato the Censor. Like his great ancestor he was a man of strict integrity, popular with the people. Among philosophers he is known as a Stoic. He served in military operations against the Spartans and in Macedonia. In the troublous days of the Catilinian conspiracy he supported Cicero. He opposed the plans of Pompey, Crassus, and Caesar. To get rid of him they sent him to govern Cyprus. He distinguished himself by turning an immense sum of money into the public treasury instead of stealing it. When Crassus and Pompey came to blows he took sides against Caesar, and, after his defeat at Munda, retired to the little city of Utica, near Carthage, where he fell on his sword rather than be reconciled to Caesar. Caesar is said to have exclaimed: "I grudge thee thy death, since thou hast grudged me the honor of sparing thy life." The residence of so great a man in so obscure a place gave point to the expression, "No pent-up Utica contracts your powers." Addison's tragedy of *Cato* is founded on the life of this Roman.

Catskill Mountains, a group of mountains about 2,000 feet high in southeastern New York. They have been stripped of their forests and are unfit for farming, but they furnish an unlimited supply of blue stone for building, and are a fine summer resort for the inhabitants of New York City. Irving has laid the scene of Rip Van Winkle's exploits in the Catskills. Passing up or down the Hudson Valley, the traveler is impressed by these mountains. They show to better advantage than the Alleghanies. The more elevated peaks reach a height of over 4,000 feet.

> Whoever has made a voyage up the Hudson must remember the Catskill Mountains. They are seen away to the west of the river, swelling up to a noble height, and lording it over the surrounding country. Every change of season, every change of weather, indeed every hour of the day, produces some changes in the magical hues and shapes of these mountains; and they are regarded by all the good wives, far and near, as perfect barometers.—Irving.

Cat-Tail, a plant of the swamps. A cluster of long, upright, sword-like leaves springs from the root. Two kinds of inconspicuous flowers are borne on a single tall stem at the height of a man's head. The fruit develops into a heavy, seal brown, cylindrical spike an inch or two in diameter. In pioneer days the cottony fruit was sometimes stripped from the stem and used in a tick as a substitute for feathers. In India elephants are fond of feeding on the cat-tail. The underground portion of the plant is starchy and is used in some countries for food. The cat-tail, with its long, graceful leaves and decorative cylinder of fruit, is a favorite plant with artists.

Catt, Carrie Chapman, one of the foremost leaders of the movement for women's suffrage in America, was born at Ripon, Wisconsin, and educated at the Iowa State Industrial College. Later she studied law. She entered the teacher's profession and became superintendent of schools at Mason City, Iowa. In 1884, she married Leo Chapman, who died in 1886. In 1890, she married George W. Catt, (died in 1905). Mrs. Catt became state lecturer and organizer of the suffrage movement in Iowa. Later she became identified with the American Woman's Suffrage Association and with the International Woman Suffrage Alliance. She

has served each of these bodies as president and has lectured in all the states of the Union and in most European countries.

Cattegat, or **Kattegat,** the strait or sound separating the east coast of Jutland, Denmark, from the west coast of Sweden, and which, with Skagerrak, the Little and Great Belts, and the Sound, forms the middle link in the chain of waters connecting the Baltic with the North Sea. Its greatest width is about 150 miles, while its depth varies from 40 to 65 feet in the western part, and from 100 to 200 feet in the eastern part. It is a treacherous body of water for the mariner, since its shoals are numerous and dangerous, and storms are frequent. Its largest and most important islands are Läsö at the north, Anholt near the middle, and Samsö at the south. The eastern shore is rocky and steep, but that on the west is low, affording easy landing.

Cattle, live stock. In its widest sense, the term includes horses, asses, camels, even goats, sheep, and swine. In stock-raising, however, it signifies animals, both large and small, of the cow kind.

Cattle have been domesticated so long that it is difficult to trace their origin. Some have supposed that they are descended from the wild ox of Central Europe. The goat in mountainous countries, the camel in the desert, the yak in the high altitudes of Asia, the reindeer on the mossy tundras of the north, and the cow on the grassy plains of all countries, each in the country to which it is best suited, furnishes milk, butter, cheese, flesh, leather, and tents for multitudes of people, and has rendered the development of civilization possible.

Horses are a luxury. Cattle are a necessity. Our cattle have been imported from western Europe. They were brought first to the New World by Columbus in 1493.

The history of cattle raising may be divided into two branches, that of cattle on farms and cattle on ranges. The management of cattle on an ordinary farm is too well known to require comment. A few cattle are kept according to the amount of pasture and feed available. The steers are raised for beef, and cows are cared for as dairy animals.

On the wide, grassy plains of Australia, Argentina, and formerly North America, cattle are reared in immense herds. Instead of stables, barns, and winter feeding, the cattle run wild like buffalo or deer. The calves run with the cows. No use whatever is made of the milk, except that a cow or two may be tethered near the rancher's shack for the use of the family. Under this system it is impossible for a rancher to know just how many cattle he owns. An unbranded calf old enough to have separated from its mother is called a maverick, and belongs to any one who wishes to put his brand upon it. Once a year the cattle in a given region are rounded up by riders, and the calves are branded, usually on the hip, by a white-hot iron, with a mark of ownership. They are then released, to run without attention for another year. In the winter season they live on standing grass, which in these regions has the peculiar quality of drying up into excellent hay as it stands. The United States leads the world in cattle raising. Russia comes second with 43,000,000 head.

The United States agricultural report of 1920 gives the following as the number of cattle on farms in the United States, with an estimate for the world:

State.	Milch cows.	Other cattle.
Maine	179,000	143,000
New Hampshire	103,000	70,000
Vermont	278,000	190,000
Massachusetts	159,000	102,000
Rhode Island	20,000	14,000
Connecticut	118,000	80,000
New York	1,493,000	909,000
New Jersey	153,000	77,000
Pennsylvania	970,000	727,000
Delaware	46,000	24,000
Maryland	180,000	138,000
Virginia	437,000	578,000
West Virginia	250,000	384,000
North Carolina	328,000	394,000
South Carolina	211,000	249,000
Georgia	461,000	771,000
Florida	156,000	945,000
Ohio	1,061,000	1,113,000
Indiana	724,000	764,000
Illinois	1,060,000	1,290,000
Michigan	873,000	773,000
Wisconsin	1,846,000	1,493,000
Minnesota	1,395,000	1,730,000
Iowa	1,353,000	2,775,000

State or Territory	Milch cows.	Other cattle.
Missouri	919,000	1,746,000
North Dakota	464,000	617,000
South Dakota	561,000	1,526,000
Nebraska	601,000	2,911,000
Kansas	935,000	2,161,000
Kentucky	457,000	580,000
Tennessee	384,000	593,000
Alabama	502,000	842,000
Mississippi	571,000	716,000
Louisiana	378,000	725,000
Texas	1,138,000	4,458,000
Oklahoma	550,000	1,300,000
Arkansas	452,000	691,000
Montana	180,000	936,000
Wyoming	82,000	787,000
Colorado	272,000	1,355,000
New Mexico	87,000	1,378,000
Arizona	57,000	1,200,000
Utah	109,000	518,000
Nevada	35,000	535,000
Idaho	136,000	537,000
Washington	228,000	298,000
Oregon	224,000	708,000
California	571,000	1,634,000
	23,747,000	44,485,000

THE WORLD.

Canada	8,000,000
United States	73,000,000
Mexico	5,000,000
Central America	2,000,000
Cuba	3,000,000
South America	76,000,000
Europe	126,000,000
Asia	112,000,000
Africa and Australia	121,500,000

See PACKING HOUSE; STOCKYARDS; BEEF; BUTTER; COLD STORAGE; CHICAGO; CHEESE; and the various bureaus under AGRICULTURE, DEPARTMENT OF.

Cattle Tick, an insect related to the mite. Like other ticks it has a parasitic habit of living on the blood of other animals, particularly cattle. It is a native of the western and southwestern plains where it has become a pest, not so much on its own account, but because it imbibes the germs of the Texas cattle fever from the blood of an infected animal and carries them, just as certain mosquitoes carry the germs of malaria, to healthy animals. Southwestern cattle have become immune to the fever, that is to say, their blood has acquired a quality which prevents the fever germs from multiplying; but northern cattle die of the plague in great numbers. In order to kill the ticks, cattle shipped out of infected districts are dipped by driving them through deep tanks of cottonseed or other oil before loading them on cars. Dipping tanks are now a regular feature of shipping stations throughout the cattle-raising country. At maturity the female tick gorges itself most disgustingly with blood, loosens its hold on the animal's hide, and drops to the ground where it lays its eggs and dies. On hatching out the young climb up bushes and fasten themselves to passing cattle to which they cling and feed until they are full grown.

Catullus (87-54 B. C.), a Roman poet. Catullus belonged to a wealthy and distinguished family. In brilliancy, wit, choice of subjects, style, and disregard of domestic proprieties, Catullus stands with the school of Roman writers most nearly represented in English literature by Shelley and Byron. His extant works are 116 lyric, elegiac, and epigrammatic poems.

Caucasian Race, one of the three great races of mankind. It is the white race, as distinguished from the yellow and the black races. The name is derived from the Caucasus Mountains in which the finest specimens of the race were believed to live. The original home of the white man is believed to be North Africa. Roughly speaking, Europe and North Africa, including Abyssinia, Western Asia and India, Australasia and the two Americas, exclusive of Indians and Africans, are peopled by the white race. Many tribes of dark complexion belong to the white race as determined by the shape of the head, hair, eyes, and lips. The hair is never woolly; the nose is large; the lips are not oblique; the cheek bones are small; and the features are regular. There are perhaps 770,000,000 Caucasians, about half of the human race. See POPULATION.

Caucasus, a region occupying the southeastern corner of Europe and extending into Asia, and belonging, before the World War, to the Russian Empire. The district is divided into two parts by the Caucasus Mountains, which extend from the Black to the Caspian Sea. The Caucasus has an area of about 185,000 square miles and a population of approximately 13,229,100. Immediately after the close of the World War, the four little states—Armenia, Azer-

baijan, Daghestan and Georgia—that occupied this region, made an attempt to gain their independence and to set up as republics. They were overpowered by Soviet Russia, however, and a part of the former Caucasus territory was ceded to Turkey, with whom the defeated states were forced to sign a treaty. The states now occupying the old Caucasus region are nominally independent soviet republics, but are really dominated by Moscow. Baku and Tiflis are still the most important towns in the old Causasus region of Europe and Asia.

Before the World War the population of the Caucasus was about 9,500,000, the greatest density being in Koutais and the least in the Black Sea region. The Aryans numbered 4,901,412, the Caucasians, 2,439,071 (Georgians, 1,350,275); the Uralo-Altaians, 1,902,142; Semites, 46,739. Of these about 4,000,000 belonged to the Orthodox Greek church; Mohammedans (Sunnite) 2,021,300, and of the Shiite sect, 884,100.

Caucasus Mountains, a mountain range forming a part of the boundary line between Europe and Asia. It extends northwesterly from Apsheron on the Caspian Sea, to the peninsula of Taman, between the Black Sea and the Sea of Azov, separated from the mountains of the Crimea by the Strait of Kertch. The range is 750 miles long and up to 125 miles wide.

Caucus, a meeting of voters to nominate candidates for office or to name delegates to a nominating convention. In American politics a caucus is strictly a party affair. It is not considered honorable to participate in a caucus held by an opposing party, and in many states such a practice is forbidden by law. In case a United States senator is to be elected it is not unusual for the legislative members of each party to caucus, that is, meet to decide upon a candidate to be supported in formal ballot by the entire party strength. A nomination in caucus by the prevailing party is almost equivalent to an election, as all who enter a caucus are held, according to political codes, to abide by the action of that caucus. The word is first used of certain gatherings of the popular leaders of Boston under the lead of Samuel Adams, to decide upon policies and candidates for office. Thus John Adams wrote in his diary under date of February, 1753: "This day found that the Caucus Club meets at certain times in the yard of Tom Dawes, adjutant of the Boston (militia) regiment." See ADAMS, SAMUEL.

Caudle's Curtain Lectures, Mrs., a series of humorous sketches by Douglas Jerrold. They purport to be lectures delivered by Mrs. Margaret Caudle to her husband, Mr. Caudle, during a period of thirty years. The time chosen by Mrs. Caudle for these lectures is after they have retired and the curtains are drawn for the night. They are full of humor, and it is by them rather than any of his other work that Jerrold is known. See JERROLD.

A CURTAIN LECTURE OF MRS. CAUDLE.

Bah! that's the third umbrella gone since Christmas. What were you to do? Why, let him go home in the rain, to be sure. I 'm very certain there was nothing about him that could spoil. Take cold, indeed! He doesn't look like one of the sort to take cold. Besides, he'd have better taken cold than taken our umbrella.

Do you hear the rain, Mr. Caudle? I say, do you hear the rain? Pooh! don't think me a fool, Mr. Caudle; don't insult me; *he* return the umbrella! Anybody would think you were born yesterday. As if anybody ever did return an umbrella! . . .

There: do you hear it? Worse and worse. Cats and dogs, and for six weeks: always six weeks; and no umbrella! I should like to know how the children are to go to school to-morrow! They sha' n't go through such weather, I am determined. No; they shall stop at home and never learn anything (the blessed creatures!), sooner than go and get wet. . . . .

But I know why you lent the umbrella: O! yes, I know very well! I was going out to tea at dear mother's tomorrow: you knew that, and you did it on purpose. How I am to go, I'm sure I can't tell; but if I die, I'll do it. No, sir; I won't borrow an umbrella: no; and you sha'n't *buy* one. Mr. Caudle, if you bring home an-another umbrella, I'll throw it into the street.

Cauliflower, a garden variety of the common cabbage. The name is the same as "coleflower." The cauliflower head is really a monstrosity. The common cabbage forms a head of closely compacted leaves. The head of the cauliflower consists of the flowering parts greatly shortened and grown fleshy. The head is merely a perverted flower-stalk—a botanical

monstrosity. Methods of sowing, transplanting, and cultivating are the same as for cabbage. The cauliflower does not head in hot weather. Unless grown in a cool locality cauliflowers should be set out early, to head before midsummer, or else they should be set out late, to head after the heat of midsummer has passed. Cauliflower is not frost-proof, but the heads can endure ten or twenty degrees of frost if left standing in the garden.

Cavalier, a term akin to cavalry. It was applied to the gay followers of the Stuarts during the great Civil War in England by way of distinction from the somber, austere followers of Cromwell. Their best side is turned toward us by Macaulay in his celebrated *Essay on Milton:*

> Thinking as we do that the cause of the King was the cause of bigotry and tyranny, we yet cannot refrain from looking with complacency on the character of the honest old Cavaliers. . . . It was not for a treacherous king or an intolerant church that they fought, but for the old banner which had waved in so many battles over the heads of their fathers, and for the altars at which they had received the hands of their brides. Though nothing could be more erroneous than their political opinions, they possessed, in a far greater degree than their adversaries, those qualities which are the grace of private life. With many of the vices of the Round Table, they had also many of its virtues, courtesy, generosity, veracity, tenderness, and respect for women. They had far more both of profound and of polite learning than the Puritans. Their manners were more engaging, their tempers more amiable, their tastes more elegant, and their households more cheerful.

Cavalieri, Lina (1874-), an Italian operatic soprano, in private life Madame Lucien Muratore. She was born at Rome, Italy. Beginning her career as a singer in cafes and music halls, Cavalieri, possessed of beauty and energy, rose to the lyric stage and then to the operatic stage. She made her debut as an operatic singer in Lisbon, Portugal, in 1900, interpreting the role of Nedda in *Pagliacci.* She made her American debut at the Manhattan Opera House, New York, in 1906. She has appeared in *Rigoletto, La Boheme, La Traviata,* and a number of other well known operas.

Cavalleria Rusticana, an Italian opera in one act, by Pietro Mascagni. The libretto was written by two of Mascagni's friends, being based on a story of Sicilian life, by Giovanni Verga. It tells of a lover who goes to the wars, his sweetheart, Lola, in the meantime marrying the village carter, Alfio. Turiddo consoles himself upon his return with a lovely maiden of the village, Santuzza, but the capricious Lola soon recaptures him. The forsaken Santuzza tells Alfio of her unhappiness, and he challenges Turiddu to a duel with knives and kills him.

At one stage of the opera the scene is empty, and in this interval the lovely Intermezzo, the favorite melody of the score, is played. This opera is very popular, owing to its dramatic situations and swift movement. It is the best of Mascagni's operas, and was one of the greatest successes of Emma Calvé as Santuzza.

Cavalry, mounted soldiers. Cavalry as a military force originated, no doubt, on the vast treeless plains of Asia, the native home of the horse. The fabled centaurs of mythology appear to have been suggested to the fertile Grecian imagination by the incursion of horseback warriors from Thessaly. The ancients very generally employed cavalry as an important arm of public service. The Assyrian horseman is depicted on monuments. Miriam's song of rejoicing gives thanks for the overthrow of the Egyptian horse and his rider. Alexander's cavalry was well drilled and efficient. The cavalry of the Romans was put to flight by the elephants of the Carthaginians. The invading hordes of Genghis Khan and Tamerlane overran eastern Europe with incredibly large bodies of light cavalry. The people of some parts of the East—as the Arabs—are well known today as excellent horse breeders and fearless riders.

During the Middle Ages the knight in heavy armor was almost useless without his horse. Even though archery and the invention of gunpowder set aside the coat of mail and the war-horse, modern nations have never ceased to regard cavalry as indispensable. Cromwell's dragoons were too much for the English cavaliers at Marston Moor and Naseby. Claverhouse's troopers harassed the Scottish covenanters for many a year. The moss trooper and the

border raider rode mettled steeds. During the war of the American Revolution Marion and his midnight riders had more than one tilt with the British horse. During our Civil War cavalry was used skillfully on both sides. Sheridan, Custer, Kirkpatrick, Morgan, Forest, and Stuart led many a daring raid. The charge of Napoleon's old bodyguard at Waterloo is one of the most dramatic incidents in modern warfare. The charge of the Light Brigade at Balaklava has been immortalized by Tennyson. The Uhlans of the Germans and the French Chasseurs had many a spirited skirmish during the Franco-Prussian War. The Lancers are a crack British cavalry regiment.

Among the old European nations and under the old methods of fighting, no more terrible cavalry regiments existed than the Russian Cossacks. During Russia's participation in the World War, the Cossacks easily sustained their reputation as a swift and fearless fighting body.

The plains Indian has been well mounted for two centuries on tough ponies, cayuses, bronchos or mustangs—the descendants of horses introduced into America by the Spaniards. Without cavalry it would have been a hopeless task for the United States army to attempt to afford protection to the rancher, railway builder and pioneer of the West.

During the World War, cavalry units were used effectively by each side as advance units before trench fighting had advanced so far as to make the use of cavalry almost impossible, and as a swift reserve. Even when the progress of reserve cavalry became almost as slow as that of infantry, because of wire entanglements, etc., it was found that the mounted troops arriving at the scene of combat were always fresher and therefore more effective than were the foot soldiers.

The airman has almost displaced the cavalry in reconnaissance work, and there is an opinion among military men that tanks and cycle units will eventually drive the horse from the battlefield. The use of gas also has something to do with the formation of this opinion, since, while horses are on the whole more impervious to gas than are men, it is far more difficult to devise protection for them than for men.

Cave, an underground chamber. Generally speaking it may be said that soaking, trickling, and running waters form caves by dissolving and removing rock material around some crack or fissure. In case of sandstone the cement is dissolved, and the stone falls into sand easily carried away. In limestone caves practically the same action takes place. Lava caves are due to the action of gas. Such are found near Naples, and in Iceland and Hawaii. For a basalt cave, see FINGAL'S CAVE. The Peak cave in Derbyshire, England, is half a mile in length and 600 feet below the surface. It is noted for marble formations in the form of cascades and trees. The deepest cave known is that of Frederikshall, Norway, 11,000 feet below the surface. Many of the European caves contain remains of the cave dwellers, the cave bear, the cave hyena, and of elephants all well preserved in deposits of lime. One of the most remarkable cave regions of the world is the limestone basin of the Ohio Valley. The various passageways of Wyandotte Cave in Crawford County, Indiana, have a total length of twenty-three miles. One stalagmite, called the Pillar of the Constitution, is 75 feet in circumference and 30 feet high. Monument Mountain is 175 feet high; and 75 feet overhead again is a vaulted dome, so lofty are some of the passages. See MAMMOTH CAVE; STALACTITE.

Cave Bear, an extinct bear of Europe. In the floors of limestone caves in various parts of Europe the bones of a large bear have been found, to which the name of cave bear has been given. Its bones are found with those of many other animals now extinct. A belief is gaining ground that the cave bear was simply a large variety of the common brown bear of Europe. See BEAR.

Cave Dwellers, a name given to prehistoric peoples of whom traces have been found in caves of western Europe. The name has come to be somewhat loosely used, even to designate all prehistoric races as though all had at some time inhabited caves. Although this can hardly be true, there is sufficient evidence that a race, tall

and of powerful build, did live, during the stone age, in caves and caverns of Belgium, France, England, Wales and Spain, and probably in many other places. Ornaments, weapons, and utensils of stone, bone, flint, and ivory have been found, as well as the teeth and bones of animals, upon whose flesh these people probably subsisted. It is evident that the cave-dwellers were ignorant of agriculture, of pottery and of metals, and that their manner of life was primitive in the extreme. See CLIFF DWELLERS.

Cavell, Edith (1865-1915), an English nurse, born at Swardeston, Norfolk, England. She received her hospital training in London, and in 1907 became head of a training school for nurses in Belgium. The institute became a red cross hospital at the outbreak of the Great War, in which German, French, English and Belgian soldiers were nursed. On August 5, 1915, she was arrested by the Germans on the charge that she had helped French and British wounded soldiers and Belgians of military age to escape from the country. She admitted that she had helped a number of allied soldiers to escape and she was tried by court martial, and sentenced to death on October 9, 1915. In spite of heroic efforts made by the American and Spanish Ambassadors to delay the execution of the sentence, she was shot on the morning of October 11.

On May 15, 1919, the body was removed to Norwich Cathedral, after a memorial service in Westminster Abbey. A memorial statue, by Sir G. Frampton was erected opposite the National Gallery, London.

Cavendish, Henry (1731-1810), a distinguished English scientific investigator of the eighteenth century. He belonged to a noble family. He studied at Cambridge, but did not take his degree. Cavendish was a lifelong bachelor. He used a fortune left him by an uncle to gratify his tastes in chemistry. He had a fine laboratory in which he shut himself off from the world completely. He was so unwilling to be interrupted that even his cook took orders from a note left in the hall. Cavendish made valuable discoveries in the composition of air and water, and, although he did not get the matter quite straightened out, he has high rank in the history of the development of chemistry. In 1766 he described inflammable air lighter than ordinary air, since recognized as hydrogen. This discovery was utilized at once in a series of efforts to construct balloons. He held to the phlogistic theory (see article on CHEMISTRY), but was puzzled to find that, after the outrush of "fire material" from substances burned in a receiver, the amount of air was diminished.

Caviare, kä-vē-är, a table delicacy made from the roe or eggs of the sturgeon. The center of production is at Astrakhan, Russia, where caviare is prepared in immense quantities from the sturgeon caught in the Volga River. Of late the Lake of the Woods, on the boundary line between Canada and Minnesota, has become an important center of production, a company having practical monopoly of the immense number of sturgeon to be found in that body of water. In preparation the roe is washed in vinegar and dried in the sun, after which it is rubbed with salt and packed in small kegs. See STURGEON; ISINGLASS.

Cavité, kä-ve-tā′, a province and city in the southwestern part of the island of Luzon, Philippines. The province has a population of 157,355. The town is situated on an island harbor. It was the scene of Admiral Dewey's victory over the Spanish fleet, May 1, 1898. It is now the naval headquarters of the United States in the Philippines. Population, about 4,000. Both province and town are tributary to Manila, with which there is communication both by water and by good roads. See PHILIPPINES.

Cavour, kä-voor′, **Count** (1810-1861), an Italian statesman. He was born and educated at Turin. He studied abroad, particularly in England. He became the prime minister and adviser of Victor Emmanuel, the king of Sardinia. He bears the same relation to united and free Italy that Bismarck bears to the new German Empire, except that his task was a more difficult and delicate one, and that he carried it to success with less sacrifice of honor and morality. Italy had been split

up by France and Austria into several kingdoms. In point of strength it might be compared to a lamb with these two large powers snarling and ready to devour. To rescue Italy from the jaws of Austria, without allowing it to fall into the mouth of France, and to unite the several petty kingdoms into one Italy was a difficult task; yet, barring the loss of Nice and Savoy to France, this was accomplished. Cavour was the statesman who planned the moves and formed the alliances. Victor Emmanuel was the man of action whose plume waved on the battlefield. See ITALY.

Cavy. See GUINEA PIG.

Cawnpore, a town of India, on the right bank of the Ganges, 628 miles northwest of Calcutta, and 266 miles southeast of Delhi. It is a modern town without any noteworthy features. Leather and cotton goods form the chief industries. Population, 1921, 213,044.

Cawnpore was the scene of the Sepoy Rebellion in 1857, when the native regiments stationed here rebelled and mutinied, under the command of Nana Sahib. General Wheeler, the British commander, was compelled, through loss of men and famine, to surrender. Men, women and children were murdered, and 200 bodies thrown into a well, which is now marked by a stone commemorating the event.

Caxton, William (1422-1491), the first English printer. He was a wealthy London silk merchant. While a commercial envoy at the court of Burgundy, he caught the book-collecting fever. Books had been coming from German presses for thirty years. In 1474, eighteen years before the discovery of America, he translated a *History of Troy* from the French and printed it for sale. This was the first book printed in England. A year later he published *The Game and Playe of the Chesse.* He then went into the business extensively at Westminster, then a suburb of London. Books from the Caxton press are the poems of Chaucer, Gower, Aesop's *Fables, Reynard, the Fox,* a version of the *Aeneid,* and Malory's *Mort d'Arthur.*

Cayenne (ka-ĕn′) **Pepper,** the pulverized fruit of a plant belonging to the same family as the ground cherry, tomato, and potato. It is not a pepper at all, but it was first imported from the port of Cayenne in French Guiana. The proper name is capsicum, but under the name of "red pepper" it has spread from tropical America, and its red, peppery pods are well known in American gardens. The young pods are pickled to make Chile sauce. In

Cayuse, kī-ūs′. See MUSTANG.

Cecil, Lord Edgar Algernon Robert (1864-), English lawyer and statesman, was born September 14, 1864, in England, and educated at Eton and University College, Oxford. As private secretary to his father, the 3d Marquess of Salisbury, he obtained much political experience, but he decided to gain political preferment by way of the bar. He became very successful in his profession and was noted for his sound exposition of the law. In 1906 he entered Parliament as Conservative member for East Marleybone. While in this position he was an ardent champion of Church interests, but took no part in the tariff reform policy of his party. In 1912 he was member for the Hitchin division of Herts. He was a leading advocate of woman suffrage, and after women had been granted the suffrage in 1918 he had the privilege of carrying a resolution permitting them to sit in Parliament.

At the outbreak of the World War Lord Cecil was appointed Under-Secretary for Foreign Affairs. He was an advocate of the League of Nations, and in 1920 attended its first assembly at Geneva. He was opposed to the policy of reprisals in Ireland.

Cecilia, Saint, the patroness of music, said to have suffered martyrdom in 230 A. D. Her day is November 22d, and her name is one of the best known in the entire Roman calendar. She has been favorite subject for poets and painters, among others, Raphael.

Cecrops, sē′krops, in Greek legend, the first king of Athens. The people of Athens were sometimes called Cecropidæ. According to older legends, he was half man and half dragon. He brought civilization to Greece, introducing agriculture, navigation, and commerce. Later accounts mention him as of Egyptian origin.

Cedar, a name applied indiscriminately to several evergreen trees with aromatic wood. The cedar of history is the cedar of Mt. Lebanon in Palestine. When Solomon purposed building a temple he sent his men, 10,000 a month, by agreement with Hiram of Tyre, to hew cedars of Lebanon. "Hiram gave Solomon cedar trees and fir trees according to all his desire, and Solomon gave Hiram 20,000 measures of wheat for food to his household." Cedars of Lebanon are to be found about 6,000 feet above the sea level. They are widely branching, hospitable trees with limbs extending horizontally as though each branch and its twigs had been pressed flat. "The cedar spreads his dark green layers of shade," says Tennyson. Cones four to five inches in length rise from the upper surfaces like candles on a Christmas tree. The tree grows to a height of eighty feet. A few fine old specimens are left on Mt. Lebanon with a girth of from fifty to sixty feet and a breadth of top nearly double their height. The Arabs regard them with the utmost reverence. The cedar of Lebanon is fragrant, and was much prized for cabinet purposes. A number of fine specimens over 200 years old flourish in English parks, but our climate is too trying for them.

See CONFIER; LEAD-PENCIL.

Cedar-Bird. See WAX-WING.

Cedar Creek, the scene of a memorable battle which took place during the Civil War between the Union forces under General Sheridan, and the Confederate forces, at Alacken, Shenandoah County, Virginia. Early in the morning of October 19, 1864, during General Sheridan's absence, the Confederates under Early surprised the Federals, who were under the temporary command of General Wright. They completely routed a large part of the Union force. Sheridan, twenty miles away, having heard of the battle, met his disheartened soldiers, gave them fresh confidence, and led an attack which resulted in the flight of the Confederates with great loss. This exploit of Sheridan is celebrated in Read's famous poem, *Sheridan's Ride.*

Cedar Mountain, Battle of, an engagement fought in the Civil War, near Culpeper, Va., on August 9, 1862, between a Union force of 8,000 under General Banks and a Confederate force of 24,000 under "Stonewall" Jackson. Banks had attacked the rear guard of Jackson's army, whereupon Jackson rallied his men and drove back the Union force. The Federals sustained a loss of 1,400 killed and wounded and many missing, the Confederates losing 1,314.

Cedar Rapids, a prosperous city of Iowa. It is situated on the Cedar River which furnishes valuable waterpower utilized in manufactories. The city is served by four railroads, as well as an electric line connecting it with Iowa City. It has excellent schools, an opera house, a public library, a Masonic Temple, and an auditorium. Coe College is located here. Among manufactures may be mentioned flour, cereals, starch, dairy products, furniture, pumps, and farming implements. There are also railroad and machine shops, foundries and pork packing establishments. The population in 1920 was 45,566.

Celery, a garden vegetable belonging to the parsnip family. Unlike many of its relatives, celery is cultivated for its leaf stems, which are eaten with salt or used to flavor soups and salads. We can hardly call celery an article of food, though thousands of tons are raised under improved methods. Celery is on the market the year around. Garden celery originated in Germany. It is started and set out and cultivated not unlike cabbage. It does best in moist, peaty soil that has been ditched and subdued thoroughly by pulverizing and the addition of the plant food that is lacking in peat beds.

The knack of celery cultivation lies in "blanching." At the proper time the celery stalks are shut off from light, either by means of boards, heavy paper, or by hilling them up with earth. As a consequence the celery turns white and tender like potato sprouts in a dark cellar. Anyone can raise celery that can raise cabbages; but not everyone knows how to blanch it successfully. Old peat swamps and skill have made Kalamazoo, Michigan, a noted celery center. In 1905, the banner year, Kalamazoo shipped over $2,000,000 worth

Celestial Empire and **Celestials,** a popular term for the Chinese Empire and its inhabitants.

Celibacy, the state of being unmarried. By common usage, the term refers primarily to men, but virginity is as much a state of celibacy as is bachelorhood. Nuns take a vow of perpetual virginity. Coelebs, originally meaning unmarried, has acquired the force of bachelor, as in *Coelebs in Search of a Wife.* Celibacy has been further intensified by its application to a single life as the result of a religious vow. The monks of various religious orders take a vow of celibacy. In the Greek Church celibacy is required of bishops and monks, but priests and deacons may remain married if married before ordination. They may not marry after ordination. In the Roman Catholic church celibacy is enjoined upon all ranks of the clergy. A married man may be consecrated only if his wife enter a religious order. The position of the Roman Church is stated well by a writer in the *Americana:*

> As no one has a right to demand to be consecrated a priest, the Roman Church has, by this addition, violated no one's right. Her position, therefore, is expressed by saying that, profoundly convinced that an unmarried clergy is best suited to her work, she admits to her ministry only those who voluntarily engage to lead a celibate life, and as long as she finds a sufficient number of such candidates she refuses to hamper her work by the employment of others.

Cell, the unit of structure in plants and animals. The lowest forms consist of a single cell, while the higher are aggregations of cells greatly differentiated. They are microscopic in size, averaging not much over one-thousandth of an inch in diameter. A typical individual cell would be spherical, but as built into organisms they become variously modified in shape. A cell is a thin-walled sac containing the jelly-like protoplasm, within which is a somewhat denser portion known as a nucleus which in its turn contains the nucleolus. This protoplasm is the fundamental living substance by which growth is accomplished. In cell multiplication the nucleus plays an important part, the division of the nucleus occurring first. It is by this power of repeated self-division that a single egg cell may become a highly organized plant or animal body.

Cellini, Benvenuto (1500-1571), an Italian goldsmith, sculptor and writer, was born in Florence. Cellini's life was one long adventure. His father wished him to become a musician; and though Cellini learned the flute, his love was the goldsmith's craft, and he was apprenticed to one of the best goldsmiths in Florence at the age of fifteen. He quickly won attention by his ability, but was forced to leave his native city because of the fatal outcome of a duel. He wandered through Italy, going finally to Rome where, under the patronage of Pope Clement VII, he became renowned as the greatest worker in precious metals in Italy. Invited to France by Francis I. in 1540, Cellini won the esteem of that ruler by creating for him numerous statues. There now stands in the Louvre the *Nymph of Fontainebleau,* a beautiful bronze figure made for Francis I. Cellini was fiery tempered, eccentric and very daring, and had a marked ability for making friends and enemies. But his works, especially such pieces as his *Perseus with the head of Medusa,* which is still treasured in his native city, stands alone for richness of detail and great beauty. Cellini's *Treatise on the Work of the Goldsmith* is valuable to the student of renaissance art, and his *Autobiography* is one of the world's finest pieces of literature.

Celluloid, sĕl′u-loid, an artificial substance used in the manufacture of combs, collars, cuffs, toilet boxes, brush handles, and many other fancy articles. It is made of cellulose, which is first converted by acids into the explosive guncotton. Camphor to give plasticity, and coloring matter to imitate tortoise shell, or some other substance, are added, and the mixture is molded by heat and pressure into the desired form. Celluloid is attractive, but not altogether safe. If touched by a live coal, spark, or lighted match, a celluloid article is likely to explode with a flash, like gunpowder. The manufacture of celluloid is interesting and quite simple. It is, however, on account of the chemicals employed, very injurious to the workmen. They

are obliged to wear rubber garments and their faces acquire a ghastly hue. The cellulose, in the form of paper, is wound on hollow spindles carrying several hundred yards each. These are unwound and sprayed with acids which convert the paper into guncotton. The guncotton is washed, ground into pulp, bleached, and dried. At this point, crude camphor, carefully weighed, and dye, if any is to be used, are added. Grinding and pressing in "masticators" follow. The masticators are huge iron rollers, geared to turn inward. The mass is mixed thoroughly and issues from the masticators in the form of great inch-thick sheets, which are piled, one upon another, to fill a heavy iron box. A steam heated hydraulic press welds these sheets together in a solid cake. This great cake of celluloid is cut into sheets, varying in thickness from one-thousandth of an inch to a full inch or more, according to the articles for which they are intended. These sheets are cut, turned, and pressed into a variety of fancy articles.

It is now used extensively in photography, especially in the making and showing of motion pictures. The "reels" of "films" that have become so familiar are reels of celluloid film from which the pictures they bear are projected onto the screen.

Cellulose, sĕl′u-lōs, a substance allied to starch and found in plants. It is the principal constituent of cell walls. One third of all vegetable material consists of cellulose. It is composed of the same elements, carbon, hydrogen, and oxygen, that form starch, sugar, and alcohol, only in different proportions. Cotton fibers are almost pure cellulose. Linen cloth, in fact most fibers, are of cellulose. Soft, unglazed paper is cellulose. Filter paper is of cellulose; so is a hornet's nest. Young wood consists largely of cellulose. Fifty-five per cent of poplar wood consists of cellulose. When heated under certain conditions, as when wood is roasted, cellulose may be converted into wood alcohol. By treating cotton with strong nitric and sulphuric acid the cellulose is converted into a powerful explosive, known as guncotton. Collodion is formed of guncotton dissolved in alcohol. By treatment with sulphuric acid, cellulose is also coverted into glucose, the basis of cheap syrup. Elder pith and cornstalk pith are chiefly cellulose. The latter is now used as an inner lining for the steel hull of a man-of-war. A three foot wall, or padding, made of corn pith is built inside of the steel plates. If by chance a shot should penetrate the steel plate and the pith lining, the water which is admitted would swell the cellulose and plug the shot hole. See GLUCOSE; ALCOHOL; CELLULOID.

Celsius, sĕl′se-ŭs, **Anders** (1701-1744), a Swedish mathematician. He was a graduate of Upsala. He became a professor of astronomy in that institution in 1730. Later he traveled and studied at Nuremberg and Paris. Celsius was interested in lineal measures. He traveled to Lapland to get the measure of a degree of latitude. He was the first to propose a division of the difference of the temperature between the freezing and boiling points of water into 100 parts. Hence the Centigrade thermometer is sometimes said to be constructed on the Celsius scale. Although Anders was the most celebrated member, it is worthy of notice that four generations of the Celsius family were famous as scholars, professors, and churchmen. See THERMOMETER.

Celts, or **Kelts,** the earliest settlers of the white race in Europe. Before the dawn of history they appear to have been subdued, and incorporated or driven westward by succeeding waves of Germans and Slavonians. The Romans called them Gauls; they called themselves Celts. The French and Belgians are supposed to be largely of Celtic blood. At the present time, however, the term is restricted to the Scottish Highlanders, the Celtic Irish, the Manx of the Isle of Man, the Welsh, the Cornish, and the inhabitants of Brittany in northwestern France. The principal dialects are the Gaelic, the Erse, the Manx, and the Welsh. The Cornish dialect is now extinct. The inhabitants of Brittany speak a dialect very similar to that of the Welsh. The English language is indebted to the Celts for many words, as bard, basket, boisterous, brand, bugbear, pony, ribbon, tether, shamrock, flannel, mackintosh, ptarmigan,

whiskey, Tory, spalpeen, brogue. The Celts are a highly imaginative people. Writers of Celtic blood have contributed largely to the bright imaginative portion of our literature. See SCOTLAND; IRELAND; BRITTANY; WALES; ARTHUR; BOADICEA; DRUIDS; BARROWS; BROCH; CROMLECH.

Cement, a well known building material. Its use was known to the Egyptians 4000 B. C. It differs from lime in that it contains an additional ingredient in the shape of a fine clay. Hydraulic lime is really a cement. The most famous cement is made by first grinding a fine clay and a pure limestone or chalk into a powder, and then burning the mixture at a high temperature. It is shipped in sacks or barrels, and requires to be kept dry. When mixed with sand and water it sets or hardens, even under water, into a drab, stone-like mass resembling in color, at least, a building limestone much quarried at Portland, England, whence the name of Portland cement.

PORTLAND CEMENT. The Lehigh Valley district in Pennsylvania and New Jersey was the center of cement production in the United States for a number of years, as a rock containing the proper constituents for making Portland cement was found there in great quantities. But as certain clays, marls, and shales from which cement can also be made are found in all sections of the country, cement mills are now operated in many of the states, including, besides Pennsylvania and New Jersey, Illinois, Indiana, Iowa, Missouri, Ohio, California and Washington. Chemically, Portland cement is a combination consisting principally of silicates and aluminates of lime, and the raw materials must therefore contain silica, alumina and lime. One large producer found that cement could be manufactured from a combination of blast-furnace slag and limestone, and it is now made in this way in large quantities.

Portland cement is the strongest and most durable of all mortars or binding materials, and in the form of concrete, which is cement mixed with sand and gravel or broken stone, it is one of the most important factors in building construction. Being a plastic material when first mixed, concrete cannot be used like brick or stone, but must be poured into molds or forms, which hold it in place until it hardens. Walls are thus constructed in wooden forms, and some years ago Thomas A. Edison devised a plan for "casting" an entire house in this manner at one operation. This form of building construction is now familiar to the public, as well as the common use of cement for concrete roads and sidewalks. Concrete has become an invaluable ally of the engineer, and is employed in all great engineering projects, such as the building of dams, bridges, retaining walls for elevated railroad tracks, subways, sewers and tunnels. City and farm buildings alike are constructed of concrete. It can be cast in any form or shape, and is often cast into blocks of various sizes for a great variety of construction purposes. It hardens under water and is therefore invaluable for submarine construction. Even large seagoing ships were built of concrete during the war. It is fireproof and sanitary, while time and exposure to the elements merely increase its strength. In building construction, concrete is usually reinforced by iron rods, steel bars, or woven iron mesh, which are placed in position in the frames before the concrete is poured into them, and thus become imbedded in the structure.

In 1920 there were 123 establishments manufacturing cement in the United States, with 25,500 employees, and a product of approximately 100,000,000 barrels, valued at $175,000,000.

OTHER CEMENTS. The term "cement" is also applied to a large number of tenacious compounds used for uniting metals, stone, glass, wood, rubber and other materials. Solder, gums, putty, mucilage, glue, plaster of Paris, and various limes, as well as the hydraulic cements, including Portland, are all included in the general term. Some of these cementing compounds are derived from mineral, some from vegetable, and some from animal substances. The binding materials of vegetable cements are gums, resins and wax, while animal cements have gelatin and albumin as their basis. Thus, a cement for pipe joints is made of iron borings mixed with sal ammo-

niac and sulphur, moistened with water. A cement for marble, etc., consists of plaster of Paris mixed with water, thin glue, or a solution of gum. Canada balsam, gum shellac dissolved in alcohol, etc., are used as cements for mending earthenware and china; and a liquid glue is made of a mixture of solutions of shellac and India rubber. Cutler's cement, used for fixing knives and forks in handles, is made of equal weights of rosin and brick dust melted together; or of four parts of rosin, one of beeswax and one of brick dust.

The "good roads" movement has greatly increased the use of cement—still in many localities it forms an excellant road surface. Durability is assured if the cement is laid over a firm foundation that will not be compressed by heavy traffic. The foundation should also be deep enough to escape upheavals from frost.

See BRICK; POTTERY; CLAY; LIME; STUCCO; PLASTER OF PARIS.

Cemetery, as distinguished from a churchyard place of burial, an open, ornamental, park-like burying ground. The term carries with it more or less of a public idea. Some churches, particularly the Church of Rome, and to an extent the Church of England, bury only in consecrated ground. Scottish cemeteries are open to all. The idea of a large cemetery, ornamented with trees and drives, open to all who choose to purchase lots, has become quite popular, especially in connection with large cities. The cemetery of Père Lachaise near Paris is one of the most celebrated in the world. Many renowned Parisians lie here. Among American cemeteries of note are Greenwood, on Long Island; Mount Auburn, near Boston; Magnolia Cemetery, Charleston; and Lakeview, Cleveland. Public cemeteries more or less adorned have been provided by nearly all American towns and communities. See CATACOMBS; PÈRE LACHAISE.

Cenci, Beatrice, the daughter of Francesco Cenci, a wealthy member of the Roman nobility, who, according to the story, was most brutal to the children of his first marriage. She failed in an appeal for protection to the Pope, and thereupon planned and executed the murder of her father. Later researches have deprived this story of most of its romantic details, and have shown Beatrice to have been a criminal, regardless of the misdeeds of her father. Her stepmother and brother, who were equally guilty with her, were executed, as was also Beatrice. The painting of her, supposedly by Guido Reni, is now believed not to represent Beatrice at all. This famous portrait, now in the Barberini Palace, Rome, is known as that of the "beautiful parricide." Shelley's drama, *The Cenci,* is founded upon the traditional story of Beatrice.

Cenozoic Era, a geological term applied to the latest of the three divisions into which strata have been arranged. It is preceded by the Mesozoic era and followed by the Recent era. Some geologists use the term to include the Tertiary and Quaternary periods, others limiting it to the Tertiary alone. It corresponds nearly with what has been called the age of mammals. The Cenozoic system is generally regarded as embracing the tertiary and post-tertiary systems of British geologists, exhibiting recent forms of life, distinguishing it from the Mesozoic, exhibiting intermediate, and the Paleozoic, ancient forms.

Cenis, se-nē′, a mountain of the southeastern Alps between southern France and northern Italy. It is crossed by the Mount Cenis Pass, 6,697 feet above the level of the sea. This is the route by which Napoleon first constructed his winding roadway over the mountain. In 1857 work was begun on a railway tunnel through the shoulder of the mountain. Workmen labored at each end. On Christmas Day, 1870, they met in the middle of the mountain and found that their borings lacked but a few inches of being in line with each other. The tunnel is wide enough for two railway tracks. It is about eight miles in length and cost nearly $12,000,000. Part of the expense was defrayed by the governments of France and Italy, and part by the Northern Railway Company of Italy. Prior to this date railroad communication between the two countries was not practicable. See BERNARD, SIMPLON; TUNNEL.

Censer, sĕn′ser, a cup in which incense is burned. The censer is usually suspended by chains and carried in the hand. It is swung to and fro to create a draft and to spread the odor of the incense. Censers of one sort or another prevailed among the Hebrews, the Greeks, and the Romans. They are now wafted before the altars of the Greek Church and of the Church of Rome, and are used, to some extent, by the Church of England.

Censor, a public official whose permission must be obtained to issue a newspaper, book, or other printed matter. During the Middle Ages officials of the church, particularly the bishops, acted as censors of manuscripts. Even with the Reformation the practice was not at once abandoned in Protestant countries. The censorship was not abolished in England until 1693. At the present time a mild censorship is maintained in Germany. A very rigorous oversight is kept up in Russia. Otherwise freedom of the press prevails throughout Europe and in all civilized countries. Libel, treason, and other objectionable matters are, of course, forbidden by law. The Roman censors were charged at first with the duties of our present assessors. By degrees they were empowered to direct people's customs and morals. They prescribed what ought to be worn and what ought not to be worn, and were even able to expel a senator from his seat.

Census, a count of the people. The Constitution of the United States provides that an actual enumeration of inhabitants shall be made every ten years. A census was taken in 1790, and one has been taken at the end of each succeeding ten years. The first census was taken by the United States marshals, and was little more than a count of the people. The compiling and elaborating of statistics now requires the employment of a permanent corps of clerks and a director of the census. The eleventh census cost nearly $12,000,000. The twelfth census, taken in 1900, has been published in ten large quarto volumes. The thirteenth census taken in 1910 was published in large quarto volumes which contained a great amount of valuable historic matter relative to domestic animals and manufactures. The fourteenth census taken in 1920 followed the plan of the thirteenth.

State Census. A number of states take a census every ten years usually in the middle of the period between two Federal censuses. The national plan is followed but the leading industries receive more attention. In Sweden, England, and other countries, regular systems of taking a census have grown out of former computations of parish statistics furnished by clergymen and others.

Canada. The first national census of Canada was taken in 1871. Since then a Dominion census has been taken every ten years, the sixth enumeration occurring in 1921. The Canadian census is very comprehensive, collecting complete statistics relating to industries, occupations, products and religion.

See Center of Population.

Centaurs, sĕn′tors, in Greek mythology, rude, savage monsters, half man and half horse. They were reputed to be descendants of Ixion and a Cloud. It is quite possible that the myth may have been derived from a race of gigantic men inhabiting the mountains and forests of Thessaly. Their chief occupation, it is supposed, was that of hunting. Being horsemen, their raids and quarrels with neighboring tribes were conducted on horseback. This may have given rise to the myth current in Pindar's time of savage hairy beings, half horse and half man. In support of this theory, it may be said that the Aztecs of Mexico were much astonished by the appearance of Cortez's cavalry. Until they saw the men dismount, they thought that horse and rider constituted a two-headed animal. The Centaurs were admitted to social intercourse by the Greeks. At one time they were invited to a marriage, but, becoming intoxicated, they were rude to the bride, and a pitched battle followed. The conflict between the Centaurs and the Greeks is a favorite subject with sculptors and poets of antiquity. Chiron was the most noted of the Centaurs. He was instructed by Apollo and Diana in the mysteries of medicine and music and in the art of prophecy. The Centaurs are represented in art as having the body and legs

of a horse. The neck and head of the horse are replaced by the body of a man from the waist upward. See CHIRON.

Centennial Exhibition, a celebrated World's Fair held in Fairmont Park, Philadelphia, May to November, in 1876. It was held during the one hundredth or centennial year of American Independence. Citizens of the city of Philadelphia gave over $4,000,000 toward expenses to which the national government added $1,500,000, and expended $500,000 on a government building. Twenty-six states erected buildings. In all over 200 separate buildings were arranged on the grounds. Over 50,000 awards were made for excellence of exhibits. Forty-nine foreign countries made exhibits. Though surpassed by subsequent efforts, the exhibition was the greatest affair of the sort, in fact, it was the first great exhibition held in America. The skilled manufacturers of the Old World were well represented, and this country ransacked field, forest, mine, and factory to make a good showing. The exhibit made by Japan was a surprise.

Americans learned a great deal from the articles on exhibition. Makers of pottery, glassware, furniture, calico, ribbons, mirrors, wall paper, and a thousand other articles of household use began to improve their patterns under the influence of European models. Printers, engravers, and wood finishers and makers of fine cabinet work were stirred up to equal or surpass the work seen at Philadelphia. The American bicycle was suggested by English wheels. About 8,000,000 fifty cent tickets were taken up at the gates. Although the cost of the exhibition was not recovered directly, nor even the half of it, the wonderful influence exerted on the manufacturers, decorators, designers, artists, schools, and the people at large—the awakening to the fact that America had so much to learn—is considered worth many times what the exhibition cost.

Many eminent Europeans visited and participated in scientific and other conferences. The Bell telephone was on exhibition for the first time. Machinery Hall, filled with inventions, together with the minerals and agricultural productions, woods, and fruits, gave European visitors respect for American inventive ability and for the future of the nation. The standing of the United States abroad was improved noticeably.

Center of Gravity, the point within a body at which it must be supported in order to balance. It is the point of application of the resultant of all the parallel forces representing the attraction of the earth for each particle of matter in the body. If a body is suspended from two points successively, the intersection of the lines connecting the points of support with the center of the earth, will give the center of gravity. The stability of a body depends upon its center of gravity being low, the line of direction, as above, falling well within the base.

Center of Population in the United States. The center of population would be the geographical center if the country were peopled uniformly. When the first census was taken in 1790 the center of population was a point near the Atlantic coast twenty-three miles east of Baltimore. By 1800 it had moved forty-one miles, to a point eighteen miles west of Baltimore. Ten years later it had traveled thirty-six miles farther westward, to a point northwest of Washington, D. C. During the next thirty years it traveled westward through West Virginia. In 1860 it was twenty miles south of Chillicothe, Ohio. In 1870 it was forty-eight miles east of Cincinnati, and in 1880 eight miles west of that city. In 1890 it was twenty miles east of Columbus, Indiana, and in 1900, the center was located six miles southeast of the same city. In 1910 it had moved almost due west 39 miles, and was in the city of Bloomington, Indiana. In 1920 it was in the town of Whitehall, Indiana, eight miles west of Bloomington. The western gain varies from fourteen to eighty-one miles per decade. The greatest gain was made between 1850 and 1860; the least, between 1910 and 1920. During the last decade it moved nearly twice as far as in the preceding, due to the rapid growth of the Pacific northwest and the middle southwest. The center of the negro population, calculated separately, is near Rome, Georgia.

Centipede, sĕn′tĭ-pēd, a class of animals allied to insects and crustacea. The centipede has a worm-shaped body of from 6 to 200 segments, with a head distinctly separated from the body by a neck. Each segment has a pair of legs, and the head bears a pair of antennae. Centipede means having one hundred feet. The millipede, or thousand legged worm, differs chiefly in having two pairs of legs on each segment, a body less flattened, and shorter antennae. The centipede lives on insects; the millipede on decaying wood. Our northern species are harmless. The centipede is useful in houses. It springs upon waterbugs and other insects, holding them down with its numerous legs until it has sucked the life out of them.

The California centipede is from five to eight inches in length. It has twenty-two segments—twenty-two pairs of legs. Each "leg" ends in a sharp point. When angered the animal clasps its victim, driving all forty-four points into the flesh, stinging as if with hot needles. Boys mount and sell them as curiosities.

Central America, that part of North America lying south of Mexico.

Central Park, the name of a public pleasure ground in New York. It comprises 840 acres. The site was purchased in 1856 and subsequently at a cost of over $7,000,000. Thirty million dollars have been expended in converting a swampy, rocky district of pigsties and shanties into lawns, drives, fountains, and ponds. Two million dollars will not more than cover the cost alone of bringing in good soil from Long Island. When laid out the park was a northern suburb of the city, but it is now quite central and is a delightful breathing place in the New World metropolis. The original park contained 150,000 shrubs and trees, including some twenty kinds of maple, beech, chestnut, birch, walnut, oak, elm, poplar, sycamore, catalpa, etc. They were protected and many have now grown to be fine, shady trees. The main drives are a lively sight on pleasant afternoons, when the gay turnouts of wealth and fashion pass so rapidly and in such numbers that one can hardly count them. Seats and shady walks are provided for foot passengers. Fine collections of palms, orchids, and other interesting flowers and plants are cared for under glass and in well kept gardens. Numerous dens, caves and cages, tanks, and wire enclosures confine all sorts of birds, fishes, and wild animals, from a beaver to a polar bear, or a jackrabbit to a giraffe. The general plan of the park was designed by Frederick Law Olmsted in 1857. It has been adhered to, in the main, ever since. The Metropolitan Museum of Art and the American Museum of Natural History are handsomely housed in the park. Under the directorship of William T. Hornaday, a collection of wild animals has been formed, scarce second to any other in the world.

Centrifugal Force. When a body is swung in a circle by a string, a constant force must be exerted to hold it in its curved path. This is called centripetal force. The reaction to this, the tendency to fly off, represented by the pull on the string, is called centrifugal force. The pull increases with the weight of the body, the speed of rotation, or with the shortening of the string. The principle of centrifugal force is utilized in mechanical dryers for laundry purposes and for the separation of liquids of different densities, as in the cream separator.

Century Plant. See AGAVE.

Cephalopod, sĕf′ă-lo-pŏd, in natural history, a term applied to any mollusk belonging to the class represented by the squid, cuttlefish, octopus, nautilus, argonaut, etc. The term is Greek, meaning head-footed. Cephalopods are without the corresponding foot or disk of the clam and other mollusks. Instead of this foot they have eight or ten arms or tentacles borne in a ring around the mouth. Hence the name. See CUTTLEFISH; SQUID.

Ceramics, sē-răm′ĭks, or **Keramics,** a word from the Greek meaning "potter's earth." It has several significations. As a collective term it designates objects made from clay, or natural earth, or from an artificial mixture of earths and minerals, and baked to insure hardness and durability. In this sense the word ceramics, includes all pottery, porcelain, earthen ware, stone ware, china ware, brick, tile,

etc. The art of producing such objects is called also ceramics or the ceramic art, the oldest of all arts.

Ceramics is a word of some dignity and seems to belong rather to the fine arts than to the useful. We find the word in most common use among Arts and Crafts Societies, Craftsmen's Guilds and the like, whose members make much of the study of ceramics. Their work in this line is artistic and beautiful and is by no means confined to decorating pottery, but includes the designing of forms and the actual shaping of the articles. See POTTERY; CLAY; PORCELAIN; BRICK.

Cerberus, ser′bē-rŭs, in the mythology of the ancients, the watch dog of the infernal regions. He is represented generally with three heads, the central one more or less human in appearance, with the tail of a serpent and with serpents coiled around his fore legs, body, and neck. See HERCULES.

Cereals, a term derived from Ceres, the goddess of corn. Beans, peas, and lentils are sometimes included among the cereals, but, properly speaking, the term is confined to the flour- and meal-producing seeds of plants belonging to the grass family. The eight prominent cereals of North America are Indian corn or maize, wheat, rye, oats, barley, buckwheat, rice, and Kaffir corn. They furnish the larger part of human food. Speltz and millet may be added to the list. Buckwheat is not a grass, but is included usually because of its use as buckwheat flour. See AGRICULTURE.

Cerebrum. See BRAIN.

Ceres, sē′rēz, in Roman mythology, the goddess of grain and harvest, whence the term, cereal. No special myth seems to have been attached to her worship until the fifth century, when the Romans identified with her the Greek Demeter, introducing from Sicily the rites of worship performed in honor of the Greek goddess. They also adopted the Greek myths connected with Demeter, especially that of Persephone, the Roman Proserpine. See DEMETER

Cereus. See CACTUS.

Cerro De Pasco, a city in Peru, 14,000 feet above sea level, situated in the sterile region at the north end of Lake Chinchaycocha. There are many copper and silver mines in the region. Population, about 14,000.

Cerro Gordo, a mountain pass in Mexico, through which passes the National road from Vera Cruz to Jalapa and Mexico. It is celebrated as the scene of a victory by General Scott with 9,000 United States troops over an army of 13,000 Mexicans under Santa Anna, April 17-18, 1847. To intercept Scott on his march from Vera Cruz, the Mexicans took up a strong position in the pass and on the heights commanding it, but after two days' skirmishing Scott succeeded in dislodging and utterly routing them, with a total loss of only 431 killed and wounded. This victory enabled Scott to take the town of Jalapa the following day.

Cervantes, ser-văn′tēs, **Miguel** (1547-1616), a Spanish poet and story writer. His parents were people of moderate means. He became a page in the family of a cardinal at Rome. He served in the war of 1570 against the Turks, and is said to have been held as a slave in Algiers for seven years. To raise money for his ransom his father sold all his possessions, and his two sisters gave up their marriage portions. In 1580 he was thus ransomed and returned to Spain. He gave the rest of his life to literature. He is known chiefly as the author of *Don Quixote,* a two volume novel that has been translated into almost as many languages as *Robinson Crusoe.* In Cervantes' day Spain was overrun by improbable stories of knightly adventure which formed the theme of almost all romances. Young and old devoured strange tales. The effect on young people was a good deal like that produced at the present time by our yellow-backed literature dealing with robbers and Indians. Cervantes had in mind to "render abhorred of men the false and absurd stories contained in books of chivalry." He threw so much ridicule on this class of writing that such romances became unpopular and disappeared from view. *Don Quixote* is a piece of brilliant caricature. Its immediate influence is considered the most remarkable in all literature. Don Quixote is a country gentleman who sets out with h

squire, Sancho Panza, to see the world and lend a hand in its reform. One of his first adventures was running atilt into a windmill. His shiftless servant, Sancho Panza, and his horse, Rocinante, have a permanent place in literature.

Cervantes lived for the greater part of his life in misery, little relieved by the success of his famous *Don Quixote,* which brought more fame than money. The secretary of the archbishop of Toledo, in his approbation appended to the second part of this novel, says that foreigners of distinction visiting Madrid inquired first of all for the author of *Don Quixote;* that he was obliged to reply that "he who had made all the world rich was poor and infirm, though a soldier and a gentleman." A few days before his death, he entered the order of Franciscan friars. He died in poverty, but serene and cheerful, on the same day as Shakespeare, April 23, 1616. His body was buried in the convent of the Trinitarian nuns, of which community his daughter was a member. In 1633 the nuns moved to a new site and their dead were exhumed and deposited in a common ossuary or bone heap. The last resting place of the greatest name in Spanish literature is, therefore, unknown.

See DON QUIXOTE.

SAYINGS OF CERVANTES.

Live and learn.
All in good time.
This peck of troubles.
As secret as the grave.
A finger in every pie.
Honesty is the best policy.
The pot calls the kettle black.
Within a stone's throw of it.
The proof of the pudding is the eating.
My thoughts ran a wool-gathering.
Why do you lead me a wild goose chase?
Spare your breath to cool your porridge.

SAID OF CERVANTES.

Cervantes smil'd Spain's chivalry away.—Byron.

His record was as glorious and as calamitous as any in literary history. He was one of the world's greatest benefactors whom the world knew not—the best of all Spaniards, the very type and embodiment of the highest Castilian nature, whom his country starved and who made her immortal.—Henry Edward Watts.

Cervantes is the father of the modern novel, in so far as it has become a study and delineation of character instead of being a narrative seeking to interest by situation and incident.—Lowell.

Cetacea, se-tā′she-ȧ, warm-blooded, four-legged animals that have become fish-like in form. In some respects they resemble the seal and the walrus, but they have become still more degenerate through disuse of their legs on land. It is difficult to believe that a whale was originally a four-legged land animal suckling its young; but such, scientists tell us, is the case. The cetacea include the various whalebone or baleen whales, the sperm whales, the dolphins, the porpoises, the so-called blackfish, the grampus, the killer, the herring hog, and the narwhal. See WHALE; PORPOISE, etc.

Ceylon, sē-lŏn′, a large Asiatic island. It is a crown colony of the British Empire. Area, 25,841 square miles. It lies in the Indian Ocean. It is really a continuation of the peninsula of Hindustan, with which it is connected by a scantily covered, rocky reef, called Adam's Bridge. The island possesses an ancient civilization, whose annals reach backward twenty-four centuries. Its ancient capital covered 256 square miles, and was inclosed by a wall 64 miles in length. It was the center of an ancient cult of Buddha. A sacred botree was here. The Portuguese colonized Ceylon in 1517. In 1658 Ceylon was wrested from them by the Dutch. In 1802 it was ceded by Holland to England.

The coast is level and fertile, the interior mountainous, and rises to a height of 8,000 feet. A well built highway encircles the entire island. Travel is interrupted, however, by swollen streams during seasons of inundation. Although the rainfall is enormous, 89 to 217 inches yearly, the rains are confined to the short period of monsoons. At other seasons the drought is severe and prolonged. Enormous storage reservoirs and extensive irrigating systems are necessary to save the crops. There are no less than 5,000 reservoirs now in use. Some were built 500 years before the birth of Christ. One modern dam is 11 miles long and cost over $6,000,000. Another embankment is from 40 to 90 feet high for a distance of 24 miles.

As might be expected from its latitude the climate of Ceylon is hot. The jungles are malarious. A list of the island animals

includes the elephant, now protected by government, bears, buffaloes, monkeys, swine, deer, leopards, jackals, porcupines, flying squirrels, bats, the mongoose, and rats innumerable; of game birds, pheasants, peacocks, partridges, pigeons, and snipe are found. The coasts swarm with crocodiles, serpents, and other reptiles. Rice, tea, coffee, cinnamon, and cocoanuts are raised in abundance. The mountains yield various metals, including nickel, cobalt, copper, tin, coal, platinum, iron, and plumbago. There are over 3,000 gem quarries. Naturally enough, the bulk of the trade is with England. The great London warehouses receive cargoes of Ceylon tea, cocoanut oil, gems, cinnamon, plumbago, rubber, cacao, tobacco, spices, and coffee. They send back cotton cloth, tools, and machinery. The business amounts to from $30,000,000 to $50,000,000 a year.

The population in 1921 was 4,497,599, of whom 8,421 were Europeans. The pearl fisheries are mentioned elsewhere. Colombo is the capital.

See PEARL; IRRIGATION.

Chain, a series of metal links fitted into one another to form a line. The links are of many forms, elliptical being the most common. The size of the wire or bar which forms the link, the size of the separate links, the metal chosen, all depend upon the purpose for which the chain is to be used. These purposes are endless, from the slenderest gold chain formed of the finest wire, through all grades of chains for personal adornment or for other ornamental purposes, up to the heaviest of steel and iron chains used for ships' cables and for conveying power in machinery. Chains are made in a variety of ways. The most common method of making iron chains consists in cutting iron bars into lengths required for separate links then each link is heated to a forging temperature, shaped and welded by hand, the welding in each instance being preceded by the introduction of the adjacent link of the chain. Steel chains are made often by machinery, the steel being rolled into bars of the required width and thickness, and the metal cut away by the machine, leaving the links, just as one cuts away wood to leave links in making a wooden chain. Just as a fine chain is stronger in proportion to its size than a large one, so a fine chain, if the material and the method of making are the same, is proportionately stronger than a large one.

Chair, a piece of furniture. The essential part is a seat. It also has legs, a back, and frequently arms. Without a back a chair becomes a stool. Chairs were known among the Romans. Richly carved wooden chairs are heirlooms in the great German houses. Nothing seems more common than a chair. It is safe to assert, however, that three-fourths of the world's population do not use chairs, but sit on mats or on the ground, at table and when resting. The sense of dignity formerly attached to the occupancy of a chair may be traced in the use of the term in connection with a professorship, as the chair of modern history, the chair of Latin, etc. The one called upon to preside over a meeting is said to take the chair. A speaker addresses the chair. The head of a committee is called its chairman. See FURNITURE.

Chalcedony, kăl-sĕd′o-ny, a precious stone found first in the ancient Greek town of Chalcedon in Asia Minor nearly opposite Constantinople. It is an amorphous form of quartz, having a milky color, more or less clouded with veins, circles, and spots. It is used in the manufacture of jewelry. Like the agate, to which it is closely related, chalcedony often contains stains resembling bits of petrified moss or plants. Sometimes pebbles contain a drop of water. Fine specimens are obtained from the centers of basaltic rocks in Scotland, Ireland, Iceland, and the Rocky Mountains. A white chalcedony containing small blood-red spots is called St. Stephen's stone. At one time chalcedony was used much more and was more highly prized than at the present time. It was employed not only for seals and rings, but also for plates, cups, and vases These were often engraved in the mos elaborate manner. See QUARTZ; SAND AGATE.

Chaldea, kăl-dē′a, in the narrow sense of the word, a province of ancient Baby

lonia, situated in the southern part of that country, along the Persian Gulf. In a broader sense, the word is used to designate the whole country of Babylonia, and even the Babylonian Empire as it existed after the Conquests of Nebuchadnezzar, although it is more properly applied to the early Babylonian Monarchy.

The earliest inhabitants of Chaldea or Babylonia are known as Akkadians or Accadians. They belonged to the Turanian family of mankind and developed, possibly before their immigration into the Euphrates valley, the elements of civilization. Among them, and conquering them, came, not later than 5000 B. C. a nomadic people of the Semitic family. The gradual union of these races with doubtless the admixture of other elements resulted in the Chaldeans or Babylonians of history. Of the various districts or provinces of the region, Chaldea was one which through all vicissitudes retained to a large extent its independence. Often Chaldean kings ruled the whole country. "Ur of the Chaldees" was the capital city at an early date, and thus Chaldea gave its name to the nation and to the early civilization that developed in the Tigris-Euphrates basin.

The Chaldeans were fond of peaceful pursuits, and dwelling in the rich alluvial district of the Euphrates basin were able to give time to something beside gaining a subsistence. The beginning of civilization made by the Accadians was turned to good account by the Semitic peoples. They adapted the cuneiform writing to their own language and it is believed that a large number of people, even the women, could read and write. Every city had at least one library of tablets and these show that progress was made in many of the arts and sciences. Various schools of literature existed, and besides poetical writings the libraries contained works on geography, arithmetic, geometry, grammar, astrology, astronomy, mythology, divination, and religion.

Although their country furnished them with no building stone, the Chaldeans made sun-dried bricks and achieved a considerable degree of skill in architecture, which, however, like that of Egypt, is more noteworthy for its vast extent and its grandeur than for any real beauty. About 2300 B. C. Babylon came into prominence, succeeding Ur as the seat of government. The Kassites from Elam made conquests in Babylonia and the Kassite dynasty reigned for several centuries. In the thirteenth century B. C. occurred the Assyrian Conquest. In 625 B. C. Babylonia again became a great power, under Nabopolassar. After that date the term Babylonia is more common than Chaldea to designate the empire. Chaldean quite as commonly describes the ancient civilization of both early and later empires. See BABYLONIA; BABYLON; NEBUCHADNEZZAR.

Chaliapin, Feodor Ivanovitch (1847-), a famous Russian basso, was born of peasant stock in Russia. He made his debut in 1892 in *A Life for the Czar*. Since then he has appeared in the principal cities of Europe and America, everywhere being acclaimed as the greatest living basso. His principal roles are *Mefistofele* in Boito's opera; *Don Quixote; Ivan*, in Moussorgsky's lyrics drama and *Dositheus* in *Khoranchina*.

Chalk, a soft white rock or earth. Chemically considered chalk is a carbonate of lime. It is formed under water by the accumulation and disintegration of tiny shells of myriads of microscopic animals. If waters are undisturbed for ages these deposits of chalk obtain great thickness, when changes in the earth's surface may bring them above the ocean to form part of a continent. The geologic period during which the great chalk beds were laid down is called the Cretaceous Age. Deep sea dredgings show that a fine white ooze is being formed now at the bottom of the ocean in a way probably very similar to that in which chalk was formed. Chalk formations usually contain fossils of seaweeds, sponges, corals, mollusks, fishes, and reptiles.

One notable chalk deposit may be followed from Austin, Texas, southwestward into Mexico. One ledge, no less than 600 feet in thickness, may be traced for 250 miles. The best known chalk formation reaches from northern France into the southern parts of England and Ireland

Chalk cliffs border both shores of the English Channel. The high, white cliffs of Ireland, with their green carpet above, are the first land that greets the eye of the American bound for Liverpool.

Chalk lacks the fertility of lime, but is used in England to dress fields deficient in the latter. It holds water well, making an excellent subsoil. It is much used in making cement, in sizing some kinds of cloth, and small quantities are molded into cylinders or crayons for blackboard use. The whiting used by the calciminer is a refined chalk. The so-called red chalk, the "keel" found by boys in clay banks, is a kind of clay stained with iron. In medicine purified chalk is administered as a remedy for an acid stomach. Such expressions as "chalk up," "by a long chalk," etc., arise from the use of chalk in keeping accounts. See LIME; GYPSUM.

Challenger Expedition, in the annals of science, an exploring expedition undertaken 1872-76 for the purpose of making deep-sea soundings. The Challenger was a British man-o'-war under command of naval officers. It carried a full equipment of apparatus for the investigation of ocean phenomena. It carried also a party of scientists. The good ship steamed 70,000 miles and was gone three and a half years. The expedition crossed the Atlantic, by way of the Canaries, Madeira, and the West Indies, to Nova Scotia. Thence the route lay south to the Cape Verde Islands, and on around the world, *via* Cape of Good Hope, Australia, China, Japan, Chile, Strait of Magellan, and home to England again. The ocean was dredged for ooze, dragged with nets for fish, and sounded with plummets for depth. Hitherto unknown oceanic plateaus, currents, submerged volcanoes, depths, and precipices were discovered. Thousands of specimens of odd animals, previously unseen by man, were brought up by the dredge and preserved in glass jars. Professor Wyville Thompson and his assistants brought home an immense amount of scientific material, and information charts were made of the oceanic floor, currents, and winds. The fauna, flora, and life conditions of the deep sea were studied as never before.

The results of the investigation were published, under the supervision of Sir John Murray, in fifty royal octavo volumes, with 29,000 pages, 2,000 plates, and a large number of maps and pictures. One of the results is a physical map of the bottom of the oceans. From the top of Mount Everest in Asia to the bottom of Aldrich Deep in the Pacific Ocean is a drop of more than ten miles. The results of the expedition also seem to substantiate the belief that animal life originated on land and not in the sea; that the sea is peopled with degenerate land animals; the further from shore and the deeper the sea, the more degenerate, sightless, colorless, and grotesque are the forms of life. The action of cold currents occasionally changes the temperature of deep sea localities so remarkably as to kill off sea animals, which may, in such cases, cover the sea bottom for leagues with their dead bodies.

The information gathered has been used freely by writers of physical geography. Among the results of the expedition were measurements of the greatest depth of the oceans. The depths are given in feet:

Atlantic	27,366
Pacific	30,000
Indian	18,582
Arctic	9,000
Southern	25,200

Challis, shăl'ly, a soft, fine, thin dress fabric of wool, wool and silk, or wool and cotton. The original challis was made at Norwich, England, in 1832. It was of silk and wool, and was of a superior quality, the special characteristics being lightness, pliability, and dull finish. Challis is made in plain colors or figured. The patterns are copied usually from French silk. They are tasteful and often artistic. They are produced in the loom or are printed. Cotton challis is one of the cheapest prints made. It is, however, soft, durable, and attractive in coloring. It is used largely for bed comforts, draperies, house gowns, dressing sacques, etc. All wool challis is quite similar to old-fashioned muslin-delaine. It is not crumpled easily, and is desirable where light weight, dainty coloring, and graceful draping are required. See DELAINE.

Chalmers, Thomas (1780-1847), a Scottish clergyman. He was a native of Fifeshire, and a graduate of the University of St. Andrews. He entered the Presbyterian ministry and became noted as a pulpit orator and a writer. He did a great work in Glasgow in alleviating the distress of the poor. In 1827 he was appointed to the chair of divinity in the University of Edinburgh. In church affairs of Scotland Chalmers ranks second only to John Knox. In 1843 he was the leader of the Free Church party that refused state help and state interference in the management of churches. This, of course, cost him his University position. He wrote a vast number of tracts, sermons, and books in defense of Free Church principles. Summed up, his life may be said to have been devoted to practical work and to the establishment in Scotland of the principle that church and state should be separate. See PRESBYTERIANS.

Chalons, Battle of, one of the great decisive battles of history, fought in Gaul in A. D. 451, near the modern French city of Chalons-sur-Marne. The battle was fought between a Roman allied army under Aetius, and a large force of Huns commanded by Attila. The Huns were defeated, and so Europe was saved from the domination of the barbarians. Two decisive battles of the World War were fought here. In 1914 the Germans were defeated here along the Marne, and in 1918 the Germans were checked again, when for the second time Paris was seriously threatened.

Chalybeate (kȧ-lĭb′e-āt) **Springs,** springs whose waters contain salts of iron in sufficient quantity to be of medicinal value. There are two principal kinds of chalybeate water—carbonated and sulphated. The carbonated contains an excess of carbon dioxide.

Chamber of Commerce, an association of merchants and others with a view to promote the business interests of the town. Most American cities have such an organization. The newspapers contain daily items relative to their efforts in the line of favorable railroad rates, the establishment of manufactures, the reception of distinguished visitors, contributions to sufferers from great disasters, and the like. A committee from a chamber of commerce representing the united commercial interests of a city has more influence than that the same men exercise if acting on their own responsibility.

UNITED STATES. The Chamber of Commerce of the United States was organized in 1912. Its membership consists of members of local chambers of commerce and other business men's associations. Its operations have a national scope and reports of its activities are made regularly to the membership. Its headquarters are in Washington, D. C.

Chamberlain, Joseph (1836-1912), a prominent English statesman, born in London. His education was received in private schools and University College, London, from which he received the degrees of LL. D. and D. C. L. During the first of his political career he was a decided Radical, but in 1886 opposed Mr. Gladstone, his chief, on the subject of Irish rule, and sided with the Conservatives. Previous to this he had served three times as mayor of Birmingham, and had represented the city in Parliament for ten years. He became colonial secretary in 1895, and in 1899 found himself fully occupied with the Boer War. In 1903 he aroused an interest extending far beyond the borders of Great Britain, by advocating an entire change in England's financial policy including a system of preferential tariffs. He has always advocated municipal reform and has been active in the betterment of the working classes. His seventieth birthday, and the end of thirty years' service as a member of Parliament from Birmingham were celebrated in 1906.

Chamberlain, (Joseph) Austen (1863-), eldest son of Joseph Chamberlain, was born at Birmingham, England. He graduated from Rugby and Trinity College, and later studied at Berlin and Paris. Quite aside from the distinction given him by his father's eminence, he quickly made his mark as a speaker of force and as a clear thinker. Austen Chamberlain has held many high positions in his government. From 1895 to 1900

he was civil lord of the Admiralty, then financial secretary, and in 1902, when Balfour became prime minister, he was made postmaster general. The next year Chamberlain was made chancellor of the exchequer. When the coalition cabinet was organized in 1913 he took office as Secretary of State for India. He resigned in 1917, but again entered the cabinet in 1918 as minister without portfolio, shortly thereafter again becoming chancellor of the exchequer. In 1921 Chamberlain was unanimously chosen as leader of the Unionists, upon the resignation of Bonar Law.

Chambers, Robert William (1865-), an American novelist and illustrator, born in Brooklyn. He studied in the Julien Academy, Paris, and later illustrated for *Life, Truth, Vogue* and other New York periodicals. His first stories appeared in 1893 and his literary work has continued since that time without interruption. His *Restless Sex* was advertised as his forty-eighth book. His stories deal with the social phases of society and he has frankly depicted some of the baser aspects of modern life. Among his best known works are *The Fighting Chance, The Firing Line, Ailsa Page, The Common Law, The Business of Life, The Girl Phillipa, Barbarians, Athalie.*

Chambers, William and Robert, two Scottish brothers, well known as publishers and writers. They were born at Peebles, Scotland; William, in 1800, Robert in 1802. They both died at Edinburgh; Robert in 1871, William in 1883. Robert was designed for the church, but his parents were unable to give him the necessary education. The family removed to Edinburgh while the boys were still young. The brothers issued penny leaflets, which led to the establishment by William in 1832 of *Chambers's Journal.* Robert's *Traditions of Edinburgh* was the first work to bring him notice. Among his other works are: *Life of Robert Burns, The Book of Days, Domestic Animals of Scotland* and *History of the Rebellions in Scotland.*

Chambray, shăm'bra, a superior quality of gingham woven in plain colors, and usually without pattern. The blended appearance which is a characteristic of chambray is produced by the use of colored warps and white weft. Chambray is woven of finer yarns than ordinary gingham. A coarser variety is known as chambray gingham. When taken from the loom, chambray is starched heavily and calendered. A Jacquard chambray is a figured chambray produced by an arrangement which allows the weft to skip certain warp threads at regular intervals. In calendering a Jacquard chambray is finished by a method which gives it the gloss, general appearance and feeling of linen. See GINGHAM; CALENDERING; JACQUARD; LINEN.

Chameleon, kă-mē'le-ŭn, a lizard-like animal. The common chameleon of Europe is six to eight inches long, with large, humpy shoulders, a thick neck, and a large head. One large fold of skin crosses the nape of the neck, another follows the spine, and a third takes the direction of a dewlap. Five toes on each foot are divided into two groups, two pointing one way and three the other, so that each foot may be used as a hand. This arrangement, together with a prehensile tail, enables the chameleon to climb about the limbs of trees in a cautious, sluggish manner. A way the chameleon has of gulping, and the fact that it will sit for an incredible time without food, led the ancients to suppose it lived on air. This curious animal cannot bend its neck, but it has two prominent eyes that turn in every direction in a comical way, independently of each other. The eye is covered by a single eyelid, having a hole in the center. It is doubtful whether the chameleon fasts as long as is popularly supposed; for, on the approach of an insect, it shoots out a long, sticky tongue with incredible swiftness, and in the twinkling of an eye transfers the luckless insect to its mouth.

The chameleon, like many other animals, has two differently colored layers of pigment, or coloring matter, in its skin. Under the influence of light, fear, or anger, or possibly at will, the color of the chameleon changes so as to resemble a gray limb or green foliage as the case may be, and render the animal less noticeable.

American chameleons, found in the pine woods from Tennessee southward to Cuba,

are smaller active animals, grass green in color. They change from gray to yellowish, bronze, and even black. Fastened by a collar and a delicate golden chain, women wear them as ornaments. They are true lizards, not chameleons.

See LIZARD.

Chamois, shăm′my, an animal occupying a position midway between the goat and the antelope. It is found in the Pyrenees, the Alps, and in the Caucasus Mountains, eastward to Persia. It is about as large as a well grown goat, but it is somewhat lighter and more graceful in structure. The general color is brown, with a pale yellowish head and a black tail. Two black horns, four or five inches in length, have straight shafts, and are recurved at the point until the tip points directly downward. The chamois is best known in the Alps, where, however, it has been hunted so persistently that the few remaining specimens are protected by law. It lives above the timber line in summer, but descends with its fawn into the upper forests for the winter.

The chamois is a remarkably agile, surefooted animal, and can leap a wall twice the height of a man's head with the utmost ease, or spring across a chasm fifteen feet in width without apparent exertion. It can also rise out of a chasm or descend to the bottom of one by a peculiar series of leaps. See GOAT; ANTELOPE.

Chamouni, shä-mo͞o-nē′, a picturesque vale in Switzerland. Politically it lies in Savoy, a province of France. Geographically it is a part of the upper valley of the river Arve. It is about twelve miles in length. It runs toward the southwest. Mount Blanc towers on one side, and a lofty, precipitous mountain bounds it on the other. The name is derived from the chamois or wild goat. The valley receives several glaciers, chief among which is the noted Mer de Glace, or sea of ice from the shoulder of Mount Blanc. The village of Chamouni, magnifrcently situated in full view of the great mountain, has a large summer population of tourists. In the winter the natives, about 2,500 in number, settle down to spinning, toymaking, carving, preparing alpenstocks, and getting ready in other ways for a summer tourist trade. The soil of the valley is scanty, but is carefully tilled. Colonies of bees gather mountain honey. See BLANC; SWITZERLAND.

Champagne, shăm-pān′, an ancient province of France. Its frontier lies east of Paris at a distance of perhaps fifty miles. It was incorporated with France about 1361. Troyes was its capital. It is celebrated for the sparkling red and white wines of the name, especially those produced on the banks of the Marne. Growers press four and one-half pounds of grapes to a quart of champagne. By a law of France the name champagne is restricted to wine produced in a district of about forty-five square miles in the immediate vicinity of Rheims. See WINE; RHEIMS; BURGUNDY.

Champaign, Illinois, a commercial and industrial city in Champaign County, 128 miles south and west of Chicago, on the Illinois Central, Wabash, Big Four and Illinois Traction railroads. It is the center of a very rich agricultural region. Foundry products, tools and textiles are the principal manufactures. The buildings of the University of Illinois are partly in Champaign and partly in the twin city, Urbana, adjoining Champaign on the east. The armory and the new stadium, the two largest buildings of the University of Illinois, and a few of the smaller buildings are on the Champaign side. Champaign contains several parks and several notable buildings, and has 36 miles of paved streets, a good system of public schools and a large library. Population 15,873 in 1920.

Champion, one who takes up the cause of another. During the Middle Ages one accused of foul crime had the right of trial by combat. He could fight for himself, or be defended by a champion who fought for him against the accusing party or representative of the accuser. The practice was sanctioned by the church, the theory being that a weak arm was nerved and a strong arm made stronger by a sense of right, and that the God of Battles would not suffer the wrong to prevail. A thrilling account of this practice may be found in Scott's *Ivanhoe.* Rebecca, the beautiful

Champlain, Samuel de (1570-1635), a French soldier and explorer. He was born in France and died at Quebec. He served under the French flag in the West Indies and Mexico. In 1603 he began the exploration of the St. Lawrence. In 1608 he founded Quebec, and in the following year discovered the lake which bears his name. He spent his life in the service of France, fighting the Iroquois, fortifying Quebec, locating settlers, and developing the fur trade of New France.

Champlain (shăm-plāne′) **Lake,** a beautiful body of water lying between Vermont and New York. It lies 90 feet above the sea. It is about 110 miles in length and is from 10 to 12 miles in width at the northern end. It discharges its waters northward, through the Richelieu or Sorel River, into the St. Lawrence. The lake is studded with half a hundred islands, which, with numerous wooded promontories, form attractive resorts and places of summer residence. The waters abound in fish. Numerous steamers ply on the lake. Burington is the chief port. The lake was discovered by Samuel Champlain in 1609. It formed part of the great canoe way between the St. Lawrence and the Hudson. The old portage is now cut by a canal. In 1776 the British defeated an American flotilla under Arnold. Burgoyne advanced up Lake Champlain to invade New York, September 11, 1814. Captain McDonough with a small force met and defeated a squadron of sixteen British ships, carrying 96 guns and 1,000 men. The engagement took place near Plattsburg, and gave the Americans encouragement when they were in sore need of it. Of many writers who have dwelt on the scenery of the lake James Fenimore Cooper may be mentioned as the earliest.

Champs Elysees, shŏn′zā-le-zā′, a celebrated public park and promenade in Paris. It is on the north bank of the river and extends from the Place de la Concorde to the Place de l'Etoile. The avenue is lined with beautiful trees and fine buildings. The name means Elysian fields. See PARIS; ELYSIUM.

Chancellorsville, Battle of. This was one of the great battles of the Civil War and was fought from May 2-4, 1863, at Chancellorsville, Va., about 55 miles northwest of Richmond. General Joseph Hooker commanded the Federal forces, to the number of about 130,000, against 60,000 of the Confederates under General Lee. During a flank movement the 11th corps of the Federal army, under General Howard, was surprised and thrown into a panic near nightfall of the first day, said to be due to bad generalship. The flank movement extended so far that the bullets of the Confederates were turned upon their own troops, and by their fire "Stonewall" Jackson was mortally wounded. The total loss of the Federal forces was about 17,200, while that of the Confederates was about 12,400.

Changeling, a child left in place of another. During the Middle Ages there was a popular superstition that the fairies were likely to take away a babe and place their own in its stead. The more vigorous a young child, the more likely the fairies were to desire it. The exchange might be made any time before the christening. Young babes were watched, therefore, closely, until that ceremony had been performed. A stunted, dwarfed, crippled, or underwitted child was believed commonly to be a changeling. Spenser speaks of changelings changed by "faeries' theft." The term is employed frequently by the British poets. Lowell, who lost a little daughter, uses the idea beautifully. He speaks of the memory of his little child as though it were a changeling left in its place by the angels.

> This child is not mine as the first was,
> I cannot sing it to rest,
> I cannot lift it up fatherly,
> And bless it upon my breast;
> Yet it lies in my little one's cradle,
> And sits in my little one's chair,
> And the light of the heaven she's gone to
> Transfigures its golden hair.

Channel Islands, a group of small islands in the English Channel ten miles off the coast of France. Area, 75 square miles. Population, 95,841. The principal islands are Alderney, Jersey, and Guernsey. They are famous for the fine dairy cattle bearing their names. The group was a part of French Normandy.

It came into possession of England with William the Norman at the time of the Norman conquest. England afterward lost the mainland of Normandy, but has retained these islands. The people still speak French, but are for the most part able to speak English. The islands have been permitted wisely to retain their old local forms of government and appear to have cared little who ruled the outside world. The Channel Islands are not bound by acts of Parliament unless specially named in them. The inhabitants are a hardy race of sailors and fishermen, with simple virtues such as are ascribed to the French settlers of Acadia in Longfellow's *Evangeline*. See BRITISH EMPIRE.

Channing, William Ellery (1780-1842), an American clergyman. He was a native of Newport, Rhode Island, and a graduate of Harvard College. He studied medicine, taught in Virginia, took up theology, and entered upon his first charge at Medford, Massachusetts. He preached his first sermon from the text, "Silver and gold have I none, but such as I have give I thee." In 1803 he had a call to Boston. In 1819 he preached a famous sermon in which he announced two articles of belief. He declared the Bible to be "a book written for men, in the language of men, and its meaning to be sought in the same manner as that of other books." He also declared his belief that Christ was a great moral teacher; no more, no less. This made him the recognized leader of the Unitarian movement in New England, a position which he held until his death. He was also an earnest advocate of the abolition of slavery, supporting the views of Garrison. He was a man of wide reading and a fine writer. His life was simple and fearless. He was a man of unaffected piety. He was respected thoroughly, even by those who could not accept his views. Coleridge said of Channing, "He has the love of wisdom, and the wisdom of love." A bronze statue of Channing stands in the public garden in Boston, opposite the church of which he was long a pastor. See UNITARIANS.

Channing, William Henry (1810-1884), an American clergyman. He was born in Boston, graduated from Harvard in 1829, entered the Unitarian ministry, preaching with much success in several American cities. He was a fine extemporaneous speaker. Later he settled in England as pastor of Hope Street Chapel in Liverpool. He was for two years chaplain of the Senate at Washington, but after the Civil War resided continuously in England. He published *Memoirs of Dr. William Ellery Channing, Life and Writings of James H. Perkins,* and, in connection with Ralph Waldo Emerson and James Freeman Clarke, *Memoirs of Madame Ossoli.*

To live content with small means—to seek elegance rather than luxury, and refinement rather than fashion—to be worthy, not respectable, and wealthy, not rich—to study hard, think quietly, talk gently, act frankly—to listen to stars and birds, to babes and sages, with open heart—to bear all cheerfully, do all bravely, await occasions, hurry never. In a word, to let the spiritual, unbidden and unconscious, grow up through the common. This is to be my symphony.—William Henry Channing.

Chanson de Roland, shon-sôn′ de rō-lon′, a French epic poem of medieval times. This poem seems, like other folk-epics, to be a collection or composite of popular songs. The Chanson de Gest (shon-sôn′ de zhest), literally song of heroic deeds, was a special form of narrative poem popular in France during the eleventh and twelfth centuries, corresponding to the ballads of old England. These songs were sung or recited by *trouvères* or minstrels. The *Chanson de Roland* is a cycle of these songs celebrating the heroic exploits of Charlemagne, and giving especially the story of Roland's death at Roncesvalles in 778, and the revenge taken by Charlemagne upon the Saracens. The French poem contains over 4,000 lines. This song of Roland, as the epic is commonly called, was the most popular heroic song of the Middle Ages. When on his way to conquer England William the Conqueror had parts of it sung at the head of his troops for the inspiration of his soldiers. The gathering together of this cycle of songs is accredited to Turoldus, a Norman *trouvère* of the eleventh century. Many of the songs date probably from a time little later than the event of Roland's

death. See ROLAND; EPIC; TROUVÈRE; BALLAD.

Chaos, kā′ŏs, in ancient mythology, that vast, infinite space out of which all things spring. "In the beginning," say the Scriptures; "Out of Chaos," say the Greek writers. The Roman Ovid represents chaos as a confused, shapeless mass out of which the universe or cosmos took shape. According to the Greek Hesiod Chaos was the mother of Erebus and Nox, darkness and night. Milton is fond of coupling night with chaos. Both quotations are from *Paradise Lost:*

The universal host up sent
A shout that tore hell's concave, and beyond
Frighted the reign of Chaos and old Night.

Where eldest Night
And Chaos, ancestors of Nature, hold
Eternal anarchy.

See MYTHOLOGY.

Chap Book, a rudely gotten up tract or pamphlet, such as was formerly sold by a chapman or peddler. The term chap, or cheap, originally meant a market, or fair. A chapman was one who sold articles at a public market, or cheap. Cheap wares were such inexpensive articles as were vended at the cheap. A chap book, therefore, is a market book, such as a market man might find suitable for rustic trade on a fair day. These chap books were at one time the only popular literature. They were printed in broad-faced, black type, adorned with a few rude woodcuts. They were printed on a single sheet of the coarsest paper and folded into twenty-four pages. They covered a vast range of subjects, including religious tracts, the lives of heroes and martyrs, dreams, fortune telling, almanacs of the weather, stories of giants, ghosts, hobgoblins, witches, notable events in history, ballads, and songs. They sold usually for a penny. They went out of fashion over a century ago. Being unbound they have become very scarce. They now command a large price as rarities. See BOOK; PRINTING.

Chapman, George (1557-1634), an English poet and dramatist. He studied both at Oxford and at Cambridge. Little is known of his history except that he went to London while a young man, was a friend of Shakespeare, Marlowe, and Edmund Spenser, and, it is supposed, held some office in connection with the court. His first poem, so far as is known, was published in 1594. From that time on, he produced many dramas, both comedies and tragedies; many poems, and, of more importance, many translations of classical works. Chapman was the earliest, and is regarded by many critics as the best, English translator of *The Iliad* and *The Odyssey.* He was associated with Jonson and Marston in the production of *Eastward Ho,* which satirized the Scotch in such a manner as to incur the resentment of James I. Chapman and Marston were imprisoned and Jonson voluntarily shared their confinement. Among Chapman's comedies may be mentioned *The Blind Beggar of Alexandria,* and among tragedies *Caesar and Pompey, Revenge for Honor,* and two dramas on the life of Marshal Biron, which Swinburne characterizes as "a storehouse of lofty thought and splendid verse, with scarcely a flash or sparkle of dramatic action."

QUOTATIONS FROM CHAPMAN.

Man is a torch borne in the wind; a dream
But of a shadow.

An ill weed grows apace.

They're only truly great who are truly good.

Young men think old men are fools; but old men know young men are fools.

'T is good to be merry and wise.

Enough 's as good as a feast.

Make ducks and drakes with shillings.

ON FIRST LOOKING INTO CHAPMAN'S HOMER.

Much have I travell'd in the realms of gold,
And many goodly states and kingdoms seen;
Round many western islands have I been
Which bards in fealty to Apollo hold.
Oft of one wide expanse had I been told
That deep-brow'd Homer ruled as his demesne:
Yet did I never breathe its pure serene
Till I heard Chapman speak out loud and bold:
Then felt I like some watcher of the skies
When a new planet swims into his ken.
—Keats.

"Chapman was a wise, manly, but irregular genius, greater as a translator of Homer than as a dramatist."

Chapultepec, chä-pool-tĕ-pĕc′, a rocky eminence about three miles from the city of Mexico. The name is said to be Aztec for "grasshopper hill." It rises about 150

feet above the surface. It was the county seat of the Aztec emperor Montezuma. A cypress grove at the western foot may yet be seen. The rock was fortified by the Spaniards. It was occupied by the Mexicans as a military academy, and was defended by a garrison. At the approach of the war between the United States and Mexico Chapultepec was relied upon to protect the road to the city from that quarter, and was defended pluckily by a garrison. It cost our invading army under General Winfield Scott three days and 863 killed and wounded to invest and take the place. The engagement took place September 12-13, 1847. Among the Americans engaged in planting batteries, pioneering, and scaling were many young soldiers whose names are well known. Some of these are Mayne Reid, George B. McClellan, Robert E. Lee, Stonewall Jackson, Raphael Semmes, Joseph E. Johnston, and James Longstreet.

Charade, shȧ-rād′, a sort of punning enigma. A word is chosen. Usually each syllable or letter is described in verse or prose as enigmatically as possible, and finally the whole word is described. A few examples may serve to make this description clear:

My *first* is company; my *second* shuns company; my *third* collects a company; my *whole* amuses company.

Answer. Co-nun-drum.

I am composed of four letters. My *last* is equal to my *whole* and my *whole* is nothing at all.

Answer. Zero.

My *first* is an article of furniture; my *second* is a grain; my *third* is what we all want. My *whole* is one of the United States.

Answer. Mat-ri-mony.

Some one threw my *first* and *second* at my *third,* but it did not hurt me for it was only a branch of my *whole.*

Answer. Mistletoe.

Of another sort is the acted charade. The players choose a word and act each syllable, or group of syllables, and finally act the entire word. The company endeavors to guess the word. Amost any device as dialogue, allusion, quotation, story telling, posing, and punning, is permissible. Words like catalog, Massachusetts, mandolin, Friday, Cinderella, antimony, silicate, sentinel, century, sirup, etc., are adapted to the purpose. Accurate syllabication is not insisted on. No twisting of meaning is considered too far-fetched for parlor charades. Sirup, for instance may be represented by a man standing on a chair (sir up).

Charcoal, a form of carbon obtained by burning vegetable or animal matter with a smothered fire. The bits of coal-black charred wood found in the ashes of a woodstove or a campfire are charcoal. When we say a lamp is smoking, it is producing charcoal. Stir up a fire so that no bits of wood are smothered in ashes, and we shall have no charcoal. Supply more air, or turn down the wick so that oil will not come too fast for the air, and the lamp will cease to smoke; that is it will stop producing charcoal.

Wood-charcoal is hard and brittle and rings like a metal. It cannot be melted, nor dissolved in water. It burns without flame. It is not subject to decay. Many farmers char the lower ends of their fence posts to keep them from rotting off. Wood charcoal is one of the ingredients of gunpowder. It has the power of absorbing disagreeable odors and is used as a disinfectant. It makes an excellent powder for the teeth, and is much used in filters, as it allows the passage of water but arrests foreign substances. Wood charcoal is in demand for fuel, and for blacksmith fires. Without doubt, Longfellow's "Village Blacksmith" used charcoal. It is indispensable in smelting certain metals. Owing to its powers of absorption, it is sometimes given as a remedy. Charcoal crayons, obtained by charring splinters and twigs of willow, are used by artists in making sketches.

Wood charcoal is produced in merchantable quantities by means of regular charcoal ovens, but the simplest and most widely used method is that of the charcoal burners. Split wood is stacked on end to form a round, pointed pile, like a cone or Indian's tepee. The pile is then banked or covered almost to the very tip with sods and earth or wet ashes to keep the air out. Holes are left here and there in the banking to admit some air. The wood is then fired at the very tip of the pile, and the

fire is allowed to eat its way down the center and from the center toward the outside. The charcoal burner remains in constant attendance, but can tend a number of pits at the same time. He watches the issuing of the smoke with concern. As long as a thick, white smoke comes out, all is going right. If the smoke grows thin, or blue, the fire is burning too vigorously and is doing its work too well. He must close up some of the air vents or pile ashes on the peak to smother the fire. After he judges that the firing has proceeded long enough, several days perhaps, the burner closes up all the vents and the peak with ashes or earth, and leaves the pile to smolder and cool. Judgment and experience are needed to burn charcoal. If the air is shut out too closely the fire may go out, and then must be rebuilt. If the fire gets under headway for an hour the pit may burn out and the work of weeks be reduced to ashes. The whole secret of the process lies in the fact that, of the different elements that go to make up wood and oil, carbon is the last to take fire. The other elements fly into gas and are consumed before carbon is ignited at all. If a fire be smothered skillfully, so as to produce the right degree of heat and the right amount of combustion, the carbon is left behind as charcoal. Oak, ash, maple, beech, pine, elm, chestnut, and sycamore are largely used by the burners. A cord of wood burned skillfully yields about thirty bushels of charcoal weighing fifteen pounds to the bushel.

Lampblack is a form of finely divided charcoal, obtained by catching the dense black smoke from half-smothered flames of oil lamps. The smoking lamps are placed in a specially constructed chamber beneath sacking on which the lampblack settles.

Boneblack is made from fresh bones crushed into fragments, and subjected to the right degree of heat in earthenware retorts. Boneblack is used as a filter; liquids passing through it give up their color.

See GUNPOWDER; CARBON; DIAMOND; COAL.

Charing Cross, an intersection of streets at the southern side of Trafalgar Square near the Thames. This busy spot is considered the geographical center of London. Distances are reckoned from it. The village of Charing formerly stood here. When Edward I was conveying his queen Eleanor's remains to Westminster Abbey, he erected a memorial cross at each stage where the bier rested. This is traditionally one of the spots. A new cross, however, was erected in 1863. Charing Cross railway station stands in the vicinity. The street called Strand runs eastward to join the Fleet. Whitehall Street leads to Parliament House and Westminster Abbey, and the Mall leads westward by St. James Park to Buckingham Palace. See LONDON.

Chariot, a historic vehicle consisting of a low axle, two wheels, a pole, and a box open behind. The driver stands in the box and guides his steed. The ancient Egyptians and Assyrians understood the making of elaborate chariots with spoked wheels, as depicted on their monuments. Achilles tied the body of Hector to his chariot and dragged it about the walls of Troy. The Egyptians pursued the children of Israel with chariots. Strong blades or knives were affixed to the wheels of war chariots to cause havoc in the ranks of the enemy. Chariot races were a favorite amusement among the ancients. A spirited account of such a race is given by Lew Wallace in *Ben Hur*. See CARRIAGE.

Charity, Sisters of a religious order, of which there are several branches within the Roman Catholic Church. One of the earliest organizations was founded by Saint Vincent de Paul in 1634. The order of Sisters of Charity in the United States was founded by Mother Seton, a convert to the Catholic religion, who devoted her life to charitable works of the church. Her first community was established at Emmitsburg, Md. There are today innumerable branches of this order in the United States and Canada, all, however, modelled along the original lines. In a general way their aim is to minister to the sick, destitute and oppressed at hospitals and in homes private or otherwise.

Charivari, a serenade, a tribute to newly-married couples. It is still prevalent in the United States, but its use has been discon-

tinued so generally, however, that it has come to be looked upon as wanting in refinement. The term is also applied to noisy, insulting demonstrations directed against some obnoxious person. This, however, not in the United States.

Charlemagne, shär'le-mān (742-814), or Charles the Great, king of the Franks. He was born at Aix-la-Chapelle. He died and was buried there, yet he was a great traveler. He is the foremost historical figure, the greatest doer of things, in several centuries. He inherited the kingdom of the Franks from his father Pippin, who had displaced the Merovingian kings by papal consent in 750. He extended the bounds of his territory until it included the greater part of western Europe. The seat of the Roman Empire had been at Constantinople for centuries, and the West had fallen away. He revived the notion of a western empire which should be independent of the Greek government at Constantinople. Pope Leo favored the idea and placed the imperial diadem on his head in St. Peter's basilica at Rome, crying aloud, "To Charles Augustus, crowned by God, great and pacific emperor, life and victory." This coronation took place in 800. It gave the West the idea of a great empire corresponding to a great church. Wherever the banners of the empire floated the church should find protection. Wherever the doctrines of the Roman Church were accepted the authority of the empire should be recognized. Pope and emperor; emperor and pope; the holy Catholic church; the holy Roman Empire; state and church hand in hand. This was the beginning of modern European history. The notion of the empire was at times the controlling political idea in Europe. It persisted until abolished by Napoleon with whose ambitions it conflicted.

During his reign of forty-six years Charlemagne made fifty-two military campaigns. He routed the Saracens in northeastern Spain; won the iron crown of the Lombards; converted the Saxons with the combined arguments of war and Christianity as far as the Elbe and the Baltic. and subjugated the Huns in the valley of the Danube. The sword of Charlemagne and the cross of the monk were inseparable. Wherever the banner of the empire was planted monasteries were built and the voices of monks rose in morning prayers.

Nor were schools neglected. Charlemagne's capital and favorite place of residence was Aix-la-Chapelle. Here he built a magnificent palace and a noble marble cathedral or "chapelle" which gave its name to the city. Schools were established throughout the empire for the training of priests, and at his own home he established what was known as the palace school for the young people, the sons of nobility who flocked to his court.

Charlemagne was a large man in every way. He fought like a lion, but it was to establish peace. He sought power, but it was to use it justly. He extended and strengthened his government, but it was for the benefit of the people. He favored education, not ignorance; art, not idle luxury; comfort and plain living, not extravagance. Scholars were encouraged to live at court. Pacific, courageous, kindly, determined, industrious, quiet, scholarly, largehearted, and merciful, in many ways like King Alfred, it is safe to say that had his successors been more like him the step of Europe might have been hastened a couple of centuries. At his death part of his work went backward. When he died in 814, he was embalmed, seated in coronation robes on a golden throne in a marble tomb in the gallery of the cathedral. A crown was placed on his head; a sword was placed in his hand, and an open volume of the Scriptures was laid on his lap, signifying the great ruler, conqueror, lawgiver, patron of learning and the son of the church. In the year 1000 Otho III opened the tomb. In 1165 Frederick Barbarossa opened it a second time, and transferred the remains to a marble sarcophagus. In 1215 the remains were inclosed in a gold and silver chest or reliquary, where they rest, with other precious treasures, in the sacred precincts of the cathedral. Charlemagne's crown, sword, scepter, coronation robes, and gloves are preserved in the imperial treasury at Vienna.

See AACHEN.

CHARLEMAGNE

CHARLEMAGNE, THE MAN.

Charles was large and robust, of commanding stature and excellent proportions, for it appears that he measured in height seven times the length of his own foot. The top of his head was round, his eyes large and animated, his nose somewhat long. He had a fine head of gray hair, and his face was bright and pleasant; so that, whether standing or sitting, he showed great presence and dignity. Although his neck was thick and rather short, and his belly too prominent, still the good proportions of his limbs concealed these defects. His walk was firm, and the whole carriage of his body was manly. His voice was clear, but not so strong as his frame would have led one to expect.

He took constant exercise in riding and hunting, which was natural for a Frank, since scarcely any nation can be found to equal them in these pursuits. He also delighted in the natural warm baths, frequently exercising himself by swimming, in which he was very skillful, no one being able to outstrip him. It was on account of the warm baths at Aix-la-Chapelle that he built his palace there and lived there constantly during the last years of his life and until his death. . . .

He wore the dress of his native country, that is, the Frankish; next his body a linen shirt and linen drawers; then a tunic with a silken border, and stockings. He bound his legs with garters and wore shoes on his feet. In the winter he protected his shoulders and chest with a vest made of the skins of otters and sable. He wore a blue cloak, and was always girt with his sword, the hilt and belt being of gold and silver. Sometimes he wore a jeweled sword, but he did so only on great festivals or when receiving foreign ambassadors.

He thoroughly disliked the dress of foreigners, however fine; and he never put it on except at Rome—once at the request of Pope Adrian, and again, a second time, to please Adrian's successor, Pope Leo. He then wore a long tunic, chlamys, and shoes made after the Roman fashion. On festivals he used to walk in processions clad in a garment woven with gold, and shoes studded with jewels, his cloak fastened with a golden clasp, and wearing a crown of gold set with precious stones. At other times his dress differed little from that of a private person.

In his eating and drinking he was temperate; more particularly so in his drinking, for he had the greatest abhorrence of drunkenness in anybody, but more especially in himself and his companions. He was unable to abstain from food for any length of time, and often complained that fasting was injurious to him. On the other hand, he very rarely feasted, only on great festive occasions, when there were very large gatherings. The daily service of his table consisted of only four dishes in addition to the roast meat, which the hunters used to bring in on spits, and of which he partook more freely than of any other food.—From Einhard's *Life of Charles*.

CHARLEMAGNE'S INCOME FROM HIS FARMS.

We desire that each steward shall make an annual statement of all our income, giving an account of our lands cultivated by the oxen which our own plowmen drive and of our lands which the tenants of farms ought to plow; of the pigs, of the rents, of the obligations and fines; of the game taken in our forests without our permission; of the various compositions; of the mills, of the forest, of the fields, of the bridges and ships; of the free men and the districts under obligations to our treasury; of markets, vineyards, and those who owe wine to us; of the hay, firewood, torches, planks, and other kinds of lumber; of the waste lands; of the vegetables, millet, panic; of the wool, flax, and hemp; of the fruits of the trees; of the nut trees, larger and smaller; of the grafted trees of all kinds; of the gardens; of the turnips; of the fish ponds; of the hides, skins, and horns; of the honey and wax; of the fat, tallow, and soap; of the mulberry wine, cooked wine, mead, vinegar, beer, and wine, new and old; of the new grain and the old; of the hens and eggs; of the geese; of the number of fishermen, workers in metal, sword makers, and shoemakers; of the bins and boxes; of the turners and saddlers; of the forges and mines,—that is, of iron, lead, or other substances; of the colts and fillies. They shall make all these known to us, set forth separately and in order, at Christmas, so that we may know what and how much of each thing we have.

The greatest care must be taken that whatever is prepared or made with the hands,—that is, bacon, smoked meat, sausage, partially salted meat, wine, vinegar, mulberry wine, cooked wine, garum, mustard, cheese, butter, malt, beer, mead, honey, wax, flour,—all should be prepared and made with the greatest cleanliness.

Each steward on each of our domains shall always have, for the sake of ornament, peacocks, pheasants, ducks, pigeons, partridges, and turtledoves.

In each of our estates the chambers shall be provided with counterpanes, cushions, pillows, bedclothes, coverings for the tables and benches; vessels of brass, lead, iron, and wood; andirons, chains, pothooks, adzes, axes, augers, cutlasses, and all other kinds of tools, so that it shall never be necessary to go elsewhere for them, or to borrow them. And the weapons which are carried against the enemy shall be well cared for, so as to keep them in good condition; and when they are brought back they shall be placed in the chamber.

For our women's work they are to give at the proper time, as has been ordered, the materials,—that is, the linen, wool, woad, vermilion, madder, wool combs, teasels, soap, grease, vessels, and the other objects which are necessary.

Of the kind of food not forbidden on fast days, two-thirds shall be sent each year for our own use,—that is, of the vegetables, fish, cheese, butter, honey, mustard, vinegar, millet, panic, dried and green herbs, radishes, and, in addi-

tion, of the wax, soap, and other small products; and let it be reported to us, by a statement, how much is left, as we have said above; and this statement must not be omitted as in the past, because after those two-thirds we wish to know how much remains.

Each steward shall have in his district good workmen, namely, blacksmiths, a goldsmith, a silversmith, shoemakers, turners, carpenters, sword makers, fishermen, foilers, soap makers, men who know how to make beer, cider, perry, or other kind of liquor good to drink, bakers to make pastry for our table, net makers who know how to make nets for hunting, fishing, and fowling, other sorts of workmen too numerous to be designated.—Extract from the *Capitulary de Villis,* issued in the year 800 or earlier.

Charles I, Charles Francis Joseph (1887-1922), Emperor of Austria and King of Hungary, succeeded to the throne on Nov. 22, 1916, on the death of his grand uncle, Francis Joseph, who had ruled sixty-eight years. Charles was the first of the imperial house of Hapsburg to obtain his education in the public schools. As a result of this he became very popular with all classes of people. His training was largely military and he became an efficient officer. His home life, prior to the assassination of Archduke Francis Ferdinand, in 1914, was very simple, but after that time he took over the estate of Este with its enormous revenue, which quite changed his mode of life. Charles took an active part in the prosecution of the war, but the day after the Armistice was signed, impelled by a movement toward a republic, Charles abdicated and fled to Switzerland.

Charles I (1600-1649), king of England. He was the son of James I, and the second Stuart sovereign. Politically and religiously he resembled his father, being an upholder of the "divine right" theory and strongly opposed to Puritanism. His determination to levy taxes without the consent of Parliament, led to the passing of the Petition of Rights in 1628. Later, after ten years of personal rule, he was obliged, because of religious troubles with Scotland, to summon another Parliament in 1640, which is known as the Long Parliament. As a result of the struggle between this Parliament and the king, civil war broke out which ended only with the execution of Charles in 1649. It is worthy of note that with the exception of Plymouth, all of the New England colonies were started during this period of religious and political persecution, thousands of English Puritans having migrated to Massachusetts Bay and the neighboring colonies from 1630-1640.

Charles II (1630-1685), king of England, son of Charles I. He came to the throne at the close of the Commonwealth in 1660, when the people, weary of the stern Puritan government of Cromwell, were ready for a change. Dickens in his *Child's History of England,* gives an interesting account of the doings of this "Merry Monarch." Of him, one of his courtiers wrote:

"Here lies our sovereign lord, the king,
Whose word no man relies on;
Who never says a foolish thing,
And never does a wise one."

His reign is a period of duplicity, and attempts to evade parliamentary rights. The notorious cabal dates from this time. In spite of, or perhaps because of, the king, some advance was made toward popular liberty, notably in the passage of the Habeas Corpus Act.

See CABAL; HABEAS CORPUS.

Charles V (1500-1558), emperor of Germany and one of the great figures in the pages of history. From Ferdinand and Isabella, his grandparents on his mother's side, he inherited Spain and the New World discovered by Columbus. From his father he inherited the rich provinces of the Netherlands. From his father's father, Maximilian, he inherited Austria. By election in competition with Henry VIII of England and Francis I of France he was made emperor, the head of the Holy Roman Empire. The idea of a universal empire—the restoration of the empire of Charlemagne—was now revived, but the Reformation broke out. With north Germany pulling one way under the influence of Luther, and England led in another direction by the authority of Henry VIII, the energies of one of the greatest men of the age were frittered away in keeping what he had, in retarding progress, in trying to reconcile irreconcilable Protestant and Catholic elements. A reign which gave promise of a single state

and a single church in all Christendom was signalized by the worst splitting up into acutely hostile camps the world has ever witnessed. After a stormy, disappointing life Charles abdicated. He laid down his crowns in 1556, and went into retirement for the few remaining years of his life.

Charles XII (1682-1718), king of Sweden. He came to the throne when fifteen, and showed so wholesome and boyish an interest in books, games, and hunting that his neighbors thought to rob him of a part of his inheritance. The Poles, the Danes, and the Russians combined to cut off provinces for their own benefit. The Danes were the first to find that they had mistaken the temper of the young lad. He adopted a plain manner of living—forbade wine on his table, dressed comfortably in a fur coat and large boots, and enjoyed sleeping on the ground wrapped in a soldier's cloak. When he had a breathing spell he turned his attention to the Russians, defeating an army of 80,000 men that were laying siege to one of his cities. The Poles and Saxons came next. For a time Sweden was the foremost military power in Europe and military men called him the madman of Europe. Very possibly success may have turned his head. In 1707 he led an army of 43,000 Swedes against Moscow, and after a campaign of two years, conducted in a hostile country altogether too far from home and supplies, he was defeated disastrously. He fled to Turkey for protection. He stirred up the Turks to make war on Russia, and brought Peter the Great to the verge of destruction. By a sudden change of Turkish sentiment his efforts came to naught, and he escaped from the Turks in disguise. Returning to Sweden he busied himself getting the affairs of his country out of the confusion into which they had fallen. In 1718 he was killed by a cannon ball while besieging the city of Frederikshald. His characteristics are not inaptly set forth by the circumstances of his death. It is said he fell with his hand on his sword, and with a picture of his great ancestor, Gustavus Adolphus, and a prayerbook in his pocket. Charles was scholarly, ambitious, and brave. He did not have the resources behind him with which to maintain his conquests. Dr. Samuel Johnson mentions his as a striking example in his *Vanity of Human Wishes.*

He left the name at which the world grew pale,
To point a moral, to adorn a tale.

Charles the Bold (1433-1477), was a duke of Burgundy, on the borderline between France and Germany. A good view of his court and an estimate of his character may be had in Scott's *Quentin Durward.* He was an ambitious man. His country had no natural boundary—no natural independence. He tried to extend his dukedom into a kingdom. He acquired territory for a time, but he was defeated signally by the Swiss in the battles of Granson and Morat. In 1477 he was slain in battle. In Scott's *Anne of Geierstein* we have a vivid picture of rending lances and the rout of Charles' army.

Charles Edward Stuart (1720-1788), the "Young Pretender." He was the grandson of James II, the last male Stuart on the throne of England. Though living abroad he assumed the title of king, and was called the Pretender. In 1745 he landed in Scotland with a little French money and 1,500 muskets. The Highlanders, encouraged by the Jacobites, chiefly Catholic, everywhere flocked to his standard. He advanced to within 100 miles of London, winning the battles of Prestonpans and Falkirk, but he was defeated finally in the famous battle of Culloden. He escaped with difficulty to the Highlands. A reward of $150,000 was offered for his betrayal but the Highlanders were loyal. Through the management of the dauntless Flora McDonald, he lay in hiding until a ship bore him away to France. France and Spain settled a pension on him. His rights to the throne, so far as the rule of succession went, were unquestioned, but his moral and his political and religious views were not acceptable to the nation.

Charles' Law. The effect of heat on a mass of gas is to increase its volume. If enclosed so that it cannot expand the pressure which it exerts is increased. The law governing these relations is called Charles' Law, or sometimes Guy Lussac's Law. It has been found by experiment that either

pressure or volume remaining constant, the other increases at a rate of 1/273 of that at 0°C, for each degree rise of temperature. Reducing the temperature then to 273°C, would, if the law held true to that limit, reduce the pressure and volume to zero, which latter is manifestly impossible. What would happen, probably, if this low temperature, known as the absolute zero, could be reached, is that the molecules of which the gas is composed, would cease their motion due to actual contact, when the state would no longer be that of a gas. Another way of stating this law is that under the same pressure the volume of a gas varies as its absolute temperature.

Charles Martel (689-741), Mayor of the Palace under the Merovingians. During the seventh and eighth centuries, while the power was rapidly slipping from the hands of the slothful Merovingian rulers of the Franks, a new family distinguished through five generations was rising into prominence. These held the office of Mayor of the Palace, and were the real rulers of the Frankish kingdom. The greatest of this family before Charlemagne was his grandfather, Charles Martel. Most of his administration was spent in war, first in subduing the rebellious parts of the Frankish kingdom itself, then in war against their neighbors. His greatest achievement, however, was the defeat of the Mohammedans at the Battle of Tours in 732. Repulsed and crushed by the forces of Charles, the Saracens retreated across the Pyrenees into Spain. Western Europe was thus saved from the Mohammedanism that engulfed the eastern world, and its savior was immortalized by the epithet Martel, meaning the hammer, added to his name.

Charleston, South Carolina, the metropolis of the state. It is situated on a peninsula at the head of a landlocked harbor, six miles long and half as wide—one of the finest in the Union. The Ashley and the Cooper rivers sweep by, one on either hand, giving a water front on three sides. By building jetties so that the tides race out and in through a narrow channel, a bar across the ocean entrance has been scoured away to a depth of thirty feet. The water at the city is forty feet deep. The harbor is defended by Fort Moultrie at the entrance, and by Fort Sumter on an island in the middle of the bay. The former was the scene of Sergeant Jasper's gallant exploit; the latter was the fortification against which the first gun of the Civil War was fired.

A settlement was begun in 1670. Fifteen years later a colony of Huguenots built a church. The old Huguenot families of Charleston correspond to the Dutch families of colonial New York. When the Revolutionary War came, Charleston was the third seaport in the colonies. It was outspoken for the American cause. A British fleet was beaten off in 1776 by Fort Moultrie, then a palmetto log fort. Charleston was the first American port to send cotton to Europe.

The city is growing rapidly. It has many and varied industries. The leading manufactures include textiles, lumber and lumber products, fertilizer, machinery, bakery products and printing and publishing. Other industries are cotton compressing, canning and preserving; the manufacture of baking powder, yeast, boxes, baskets, rattan and willow ware, awnings, sails, tents, brooms, copper tin and sheet iron products, flour and grist mill products, cordage, twine and clothing.

Charleston is one of the leading commercial cities of the South. During the period 1910-1916 wharfage and terminal improvements costing about $5,500,000 were made by the United States. The city is a port of call for steamers engaged in the coastwise trade and those connecting with European ports, Hawaii, and the western ports of South America. There is regular steamship connection with Baltimore, Philadelphia, New York, Boston and several smaller ports to the north; and with Savannah, Jacksonville and New Orleans to the south. This city is the only coal-exporting port on the coast of the South Atlantic states, and ships for Cuba and South America coal here. It is also a center for the distribution of petroleum, and contains two storage plants, each having a capacity of 700,000 gallons. Other exports include cotton, rice, fruits, fertilizer, lumber, and naval stores. The government ter-

minals at North Charleston, for use in peace or war, cost approximately $30,000,000.

Charleston has about 20 banks with large resources. There are also a number of building associations having a large capital. There is an adequate public school system here, and the educational facilities are augmented by many private schools.

The city is governed by the charter of 1836. The mayor is elected for four years. One-half of the city council is elected by wards and the other half at large. Administration boards are partly appointed by the mayor and partly elected by the council. Population, 1920, 67,957. See S. Carolina.

Charleston, the capital city of West Virginia and county seat of Kanawha County. It is the center of trade for large coal and lumber interests, its situation at the confluence of the Elk and Kanawha Rivers affording ample shipping facilities. The city has many fine public buildings and handsome residences. Its industries include iron foundries, steel plants, boiler works, marble works, woolen mills, dye works, machine shops and ship yards. There are manufactories of furniture, glass, wagons, and axes. The city is supplied with natural gas. Its population in 1920 was 39,608.

Charles's Wain, an English name for the constellation of the Great Bear—the Big Dipper. The term is understood to be a corruption of Carl's wain, or the peasant's wagon.

> And we danced about the may-pole and in the hazel copse,
> Till Charles's Wain came out above the tall white chimney-tops.—Tennyson, *May Queen.*

Charlevoix, Pierre Francois Xavier de (1682-1761), a French Jesuit traveler, was born in Saint Quentin. He became a Jesuit in 1698, and from 1705 to 1709 he taught in Quebec. After returning to France for a brief stay, he was again sent to America, by the Duke of Orleans, this time to find the "Western Sea," supposed to be beyond the Mississippi River. Charlevoix journeyed up the St. Lawrence, through the Great Lakes, and down the Mississippi to New Orleans. His fame rests chiefly on his *History and General Description of New France,* a journal of his travels in America.

Charlotte, N. C., the county seat of Mecklenburg County and an important industrial center, is situated on Sugar Creek near the southern boundary, 174 miles southwest of Raleigh. It is served by the Seaboard Air Line, the Norfolk Southern and the Piedmont & Northern railways. Charlotte is in a cotton-growing region, and the leading industries are related to cotton. They include the manufacture of cotton goods, cotton-mill machinery, cottonseed oil and its by-products. Other manufactures include fertilizers, beltings, drugs, cement and harness. Among the important buildings are the Federal building, courthouse, auditorium and Y. M. C. A. and Y. W. C. A., Presbyterian College, Saint Mary's Seminary, North Carolina Medical Colleges, Elizabeth College and a conservatory of music are located here. The city was settled in 1750, incorporated in 1768, and became the county seat in 1774. The Mechlenburg Declaration of Independence was adopted here May 20, 1775. During the Civil War the full Confederate cabinet met here for the last time. Population, 1920, 46,338.

Charlottetown, a city of Prince Edward Island, Canada, the capital of the province, is in Queen's county, on Hillsborough Bay, at the confluence of the Hillsborough, the York and the Elliott rivers. It is on the Canadian Government Railway, 160 miles by rail north by east of Halifax. The city is well laid out, with broad, well-paved streets, running at right angles, and has an excellent harbor. The principal business streets are Water and Queen streets. There are many fine public buildings in the city, a modern public school system, and two colleges, the Prince of Wales College and St. Dunstan's (Roman Catholic). There are also several hospitals, and four daily newspapers. An American consul resides here. The leading manufactures for export are condensed milk and tobacco. Other important industries are represented by foundries and machine shops, agricultural implement factories, a can factory, pork packing, lobster packing, and factories for the manufacture of starch,

sashes and brooms. There is an excellent water supply which comes from artesian wells outside the city limits.

Charlottetown was originally called La Joie, and was founded by the French in 1750. In 1763 it was ceded by France to Great Britain. A convention was held here in 1864 to discuss the legislative union of the Maritime Provinces, and this grew into further conferences resulting in Dominion confederation in 1867. The population in 1921 was 12,347.

Charon, kā′ron, in classical mythology, the ferryman whose duty it was to transport the souls of the dead over the rivers of the lower world. Charon was the son of Erebus and Nox. He is described as an old man, gloomy and sad of countenance,

Charter Oak, a fine old oak tree at Hartford, Connecticut. It was over six feet in diameter at the time of its destruction by a storm, August 21, 1856. This oak is one of the historic trees of America. Connecticut was an independent colony governed by its own assembly, elected in accordance with a charter granted by the king of England in 1662. In 1686 Sir Edmund Andros was sent over to govern the New England colonies. In October of the following year he visited Hartford and called on the assembly to surrender its charter. The story runs that the debate was prolonged until late, when the lights were extinguished and a Captain Wadsworth took the charter from the table and hid it in a hollow in this oak tree, where it remained until a change of government in England enabled the colony to resume its previous form of government. See HARTFORD.

Chartists, and **Chartism,** a radical reform movement in England about 1830-48. The name is derived from a charter, or declaration of needed reforms. It was drawn up by a joint committee of six workingmen and six members of Parliament. The reformers insisted on what now seem matters of course to an American, but they were then deemed revolutionary, and, indeed, they went further than most of the original American states had gone at the opening of this period. The leading demands were six: (1) a vote for each man; (2) parliamentary representation according to population; (3) voting by ballot; (4) pay for members of Parliament so that poor men could afford to serve; (5) annual elections; (6) abolition of property qualifications for membership in Parliament. The movement was attended by riots and immense meetings, but the excitement subsided with time. Twenty years later a second agitation resulted in a substantial granting of the demands, though, even yet, an unmarried son at home may not vote, neither does a member of Parliament receive compensation. The conditions of the Chartist period may be seen in Charles Kingsley's *Alton Locke* and *Yeast*.

Chartres, shärter, a city fifty miles southwest of Paris. It is an ancient town half surrounded by walls. It is the seat of the trade usual to a prosperous agricultural region. It is noted for its vast, magnificent Gothic cathedral, one of the finest in Europe. This church has two spires of different construction. The tallest is 403 feet in height. It is considered the most perfectly proportioned spire in the world. There are 130 stained glass windows of exquisite workmanship, some of them dating from the thirteenth century. Henry IV was crowned in the choir of this cathedral, and St. Bernard preached the Second Crusade here. Quite in contrast are the surrounding wood and plaster houses. They are set with the gable toward the streets which, in many places, are so narrow and so steep that carriages cannot pass.

Charybdis, ka-rĭb′dis, in Greek mythology, a terrible sea monster who, three times each day, sucked in the sea and discharged it again in a whirlpool. Charybdis was supposed to have been a daughter of Poseidon and Gaea, whom Zeus in anger had hurled into the sea. There she became a whirlpool and swallowed up ships that came too near. Charybdis was located in the Straits of Messina, on the Italian side. Navigators striving to escape the fate of being sucked into the whirlpool were likely to run into danger from Scylla, another monster on the opposite shore. The words Scylla and Charyb-

dis came to be used proverbially to signify opposite dangers that beset one's path. The poet Horace says that an author striving to avoid Scylla often drifts into Charybdis; that is, in trying to avoid one fault, he falls into some other. In Shakespeare's *Merchant of Venice,* Launcelot, the clown, says to Jessica, "Thus when I shun Scylla, your father, I fall into Charybdis, your mother." See SCYLLA.

Chase, Salmon P. (1808-1873), chief justice of the United States. He was born at Cornish, New Hampshire, January 13, 1808, and died at New York, May 7, 1873. His father was a farmer. When a boy he lived with his uncle, Bishop Philander Chase, near Cincinnati, for the purpose of attending his school. Many anecdotes are told of the bookish boy. With a party of his classmates he started for a trip in the woods. The other boys agreed to make him carry the lunch basket. This he did uncomplainingly until he thought he had done his share. Then he offered it to one after another, but all declined; whereupon young Salmon set the basket down. The party went on, thinking that Salmon would go back after it, but he was evidently the last one who intended to do so, and they were obliged to send one of their own number for it. At another time his uncle told him to kill and dress a pig. He got his water too hot, with the result that the bristles set, and could not be pulled out. Nothing daunted, young Salmon obtained his cousin's set of razors and shaved the pig admirably from head to tail. He was complimented by his uncle, the bishop, for the excellency of his workmanship, but a settlement came later when his cousin tried to use his razors.

Later Chase graduated at Dartmouth and applied to an uncle Chase, then senator, for a position in a Washington department. "My boy," said the old senator, "I'll give you a half a dollar to buy a spade, and you may dig your way into something of a place in life; but I will not get you a place in a government office. I have ruined one or two young men in that way already, and I'm not going to ruin you. The man who enters the government service seldom does anything more. He is swallowed up in these departments and that is the last heard of him." Young Chase thought his uncle hardhearted but he swallowed his disappointment, taught school for a short time, studied law under William Wirt, and opened office at Cincinnati. His first fee was fifty cents, which his client came in the next day and borrowed again. His first case of importance was the defense of a negro. People said that a bright young man had ruined himself, but such did not prove to be the case.

He became governor of Ohio, then a United States senator. He was a candidate against Seward and Lincoln for the presidential nomination. Lincoln made him secretary of the treasury, and later chief justice of the supreme court. Chase was a very able, fearless man, of unquestioned integrity and patriotism. He never could rid himself of the notion, however, that he ought to have been president instead of Lincoln. He not infrequently made himself very disagreeable. He was a man of regular habits and simple tastes, but maintained an elegant home. Under the management of his daughter, Kate, who married Senator Sprague of Rhode Island and was afterward divorced from him, the Chase home in Washington was for many years noted for hospitality and brilliant receptions.

Chateaubriand, shā-to-brē-ŏn′ (1768-1848), a brilliant French essayist. He lived through the scenes of the French Revolution, the reigns of Napoleon Bonaparte, and the later Bourbons. He held numerous positions of trust and honor, but is noted for his incisive writings. His most noted work is the *Genius of Christianity,* written in favor of Catholicism. A pamphlet on Napoleon and the Bourbons was declared by Louis XVIII to have been worth 100,000 men to him in regaining the throne of his fathers. A touch of interest is added when we know that he traveled in North America and wrote an epic poem on *The Natchez,* commemorating the fate of the red men. Some critic has called him a link between Goethe and Byron. Chateaubriand's works, in 20 volumes, were edited by Sainte-Beuve.

Chatham. See PITT, WILLIAM.

Chatham, Ontario, the county town of Kent county, lies about midway between St. Clair and Lake Erie, a position which has made it an important railroad center. It is served by four lines, and is connected with a fifth by an electric line (the Chatham, Wallaceburg & Lake Erie). The Thames River, which flows through the city, is navigable for lake boats to this point. Chatham has a large trade in farm products and supplies, and also makes motors, well machinery, wagons and automobiles, cotton gloves, overalls, and a variety of other manufactured articles. Hydro-electric power is supplied from Niagara Falls, and natural gas is piped from a field about fifteen miles distant. Harrison Hall houses both the city and the county offices. The government armory, completed in 1905, is the most conspicuous structure in Chatham. There are several important schools here, among them the Ursuline Convent and the Canada Business College. Chatham was settled in 1812, and incorporated in 1895. Population, 1921, 13,256.

Chattanooga, the seat of Hamilton County, Tennessee. It is pleasantly situated on the south bank of the Tennessee River. The presence of coal and iron, together with transportation facilities both by river and by rail, make the city a natural center of iron manufacture. Boilers, steel roofing, gas burners, wagons, furniture, hosiery, and patent medicines are specialities. The city had a population in 1920 of about 58,000. Suburbs add a full half to this estimate. The city lies at the foot of the Cumberlands. Lookout Mountain, Missionary Ridge, and Orchard Knob are in the outskirts. The vicinity is memorable in the history of the Civil War for a series of engagements known as the battle of Chattanooga, fought November 23, 24, and 25, 1863. The Federal troops 60,000 strong, led by Grant, Thomas, Hooker, and Sherman, defeated 40,000 Confederates under General Bragg. The total killed, wounded, and missing for both sides was 12,531. The battlefield of Chickamauga, now a national military park, lies within the Georgia border, six miles to the eastward. The entire vicinity is scenic and historic. Large, comfortable hotels and mild winter weather render the city a favorite resort.

Chattel, a legal term very similar to, though not strictly coextensive with, "personal property," that is, property which passes to the executor or administrator as distinguished from real property, which is inheritable and passes to an heir. Chattels are such personal property as can be physically delivered; thus, money actually in one's possession is a chattel, while a valid claim for money due is not.

Chattels are classified as "personal" and "real." Personal chattels are such property as furniture, live stock, clothing, etc., while real chattels are such possessions as are not actually owned—lands held on lease, mortagages, etc. Crops that are still growing also come under the latter title. The term "goods" is practically coextensive with "personal chattels."

Chatterton, chăt'er-ton, **Thomas** (1752-1770), an English poet. It is not so much for his poetry that Chatterton's name is remembered, as for a peculiar literary deception which he practiced upon his contemporaries. It is not an uncommon thing for a person to claim the authorship of that which has been produced by others. This boy—he was not yet eighteen when he died—produced poems, many of them of merit, and pretended that they were the work of writers of a bygone age. When his story is known he is not apt to be blamed greatly.

Chatterton was born at Bristol. His father—a cultured man—died before the boy's birth, leaving the care of the two children to the mother. Thomas developed into a dreamy, melancholy child, and he began to write when he was 11 years old. In an old chest belonging to his uncle he found a romance of a monk, Thomas Rowley, and his life and experiences were worked out in a wonderful way by the precocious boy. The many beautiful poems which Chatterton claimed that Rowley had written, were probably produced between 1764 and 1768. He went to London, and some of his work was accepted, but he was poorly paid.

He became discouraged and, before he was quite eighteen years of age, took his own life. He was buried by strangers in a pauper's grave. Later his remains were removed to the old churchyard of St. Mary Radcliff. A monument was erected to his memory, inscribed with lines from his own pen: "To the memory of Thomas Chatterton.—Reader, judge not! If thou art a Christian, believe that he shall be judged by a Superior Power. To that Power only is he now answerable."

Chaucer, Geoffrey, chaw'ser, jef'frĕ (1340-1400), an English poet. He was the son of a London wine merchant. He was brought up at court as a ladies' page. In 1359 he went to France in the army of Edward III, was taken prisoner and ransomed. A little later he went abroad several times as an ambassador. In this way he became familiar with Italian literature, this being before the day of printing. He was at one time collector of customs. In 1386 he was dismissed by the court to a life of poverty, yet in the end received a pension, and at his death he was the first to be buried in that part of Westminster Abbey now known as the Poets' Corner. There were several English dialects. Chaucer made his dialect so prominent that it became the literary language of England.

At a time when printed books were unknown and diverting manuscripts few, Chaucer wrote to amuse the queen and the court. A parliament of the birds, a story of the Trojan war, a story of a glass temple on which famous names are carved, but which continually melt away, and stories of famous women, such as Dido and Cleopatra, are some of the subjects. His fame rests on the *Canterbury Tales,* the best stories in verse in the English language. Chaucer is called the father of English poetry. He was not the first to write verse, but his predecessors wrote in Anglo-Saxon, almost as difficult to read as French. Chaucer is the first great English poet.

The *Tales* were not the invention of a day. It was the fashion of the time to make a pilgrimage to the shrine of Thomas à Becket at Canterbury, "the holy blissful martyr for to seek." A company of people representative of the different classes of society happens together at the Tabard Inn in Southwark. This inn is still to be seen in southwest London at the beginning of the Canterbury road.

The poet introduces the characters in a prologue. Some of the more prominent of them are a clerk, or scholar, who would rather have twenty books of Aristotle in "blak or reed" than rich robes, "And gladly wolde he lerne, and gladly teche"; a "veray parfit gentil knight," and his son, a yonge squire, who was

A lovyere and a lusty bachelor;

a prioress,

That of her smyling was ful symple and coy;

a ruddy, baldheaded monk, fond of hunting,

A fat swan loved he best of any roast;

a wanton merry friar,

He was an esy man to give penance;

a merchant with a forked beard and Flanders' beaver hat; a wise sergeant of the law,

Nowher so besy a man as he ther n'as,
And yet he semed besier than he was;

a franklin,

Whit was his berd as is a dayesye;

he cared not who was his cook, if the sauce were right; a doctor, who spoke of "phisik and surgerye" and who loved gold; a good wife with red stockings and new shoes, a bold face and a shrewd tongue, and yet she was a worthy woman all her lyve:

Housbondes at chirce dore she hadde fyve;

a poor parson rich in holy thought and work, who visited the sick and set an example of a right life, preaching the gospel,

That firste he wroghte and afterward he taughte.

Other characters are a plowman; and a miller

Well koude he stelen corn and tollen thries,

a reve; a pardoner; a haberdasher; a carpenter; a weaver; a dyer; a cook; a shipman; and, lastly, their host of the Tabard Inn.

All these characters, twenty-nine in all, Chaucer sets on horseback under the guidance of the Tabard host. Under the influ-

ence of a common purpose, restraint is for the once relaxed, social distinctions are laid aside. They set off a merry company. As they jog along each is to tell a tale. It is difficult to describe the tales without repeating them. So far as Chaucer found time to compose them, he puts into the mouth of each such a tale as might be expected of one in that particular walk of life. In this way the tales give a picture of the manners, jokes, and ways of thinking of the different kinds of people then living. The full number of tales was never completed.

The study of Chaucer is not at all difficult if undertaken with an edition provided with a vocabulary. The old spellings, plurals, possessives, and verb forms are instructive. *Swete* and *smale,* each pronounced in two syllables, are the old forms of *sweet* and *small; ton, eyen,* and *shoon* are old plurals of *toe, eye,* and *shoe,* formed by adding "n" to the singular. *Slepen* and *longen* are the equivalents of the verbs, *sleep* and *long.* The prologue is one of the most artless, cutting, musical bits of writing in the English language. Some of the tales are certainly a trifle coarse. Chaucer ingeniously pleads that he is not at fault, that he must tell the tales as they were told. Chaucer was called by his contemporaries the Flower of Poets.

The star of a misty morning.—Welsh.

The firste fynder of our fair language.—Occleve.

Our greatest poet of the Middle Ages.—Hallam.

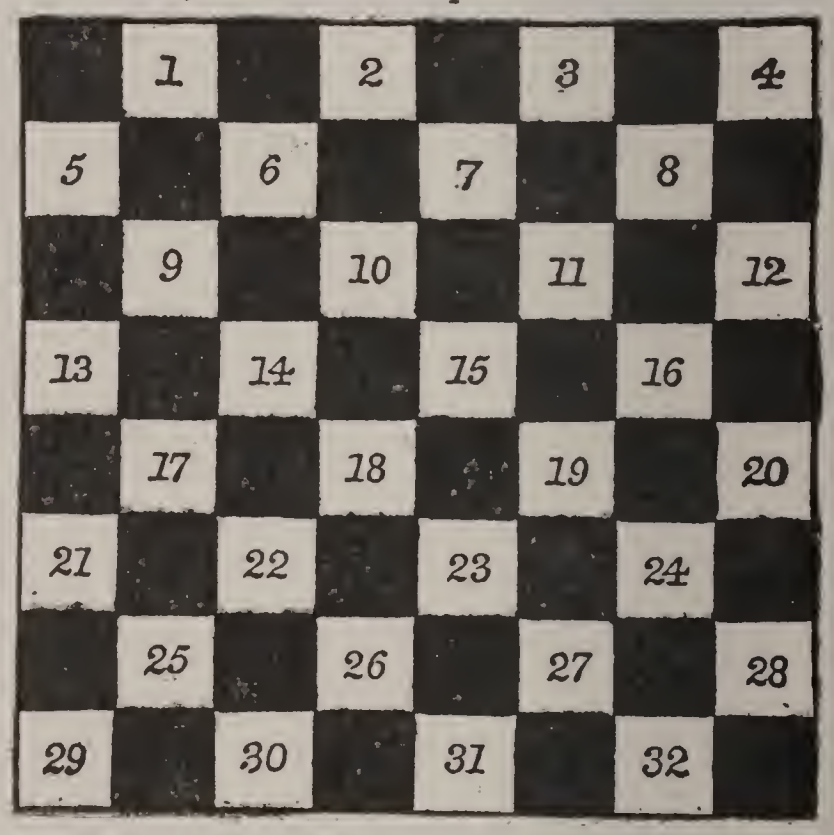
Dan Chaucer, well of English undefyled
On Fame's eternall beadroll worthie to be fyled.
—Edmund Spenser.

Chautauqua, sha-taw′qua, the Indian name of a beautiful lake in extreme western New York. The name has also passed to the county in which the lake is situated and to a summer resort on its shores. The Chautauqua Assembly, instituted by Dr. John Vincent in 1874 to give vacation instruction to Sunday school teachers has grown to large proportions as a summer center for teachers and reform rallies. The Chautauqua Reading Circle grew out of the Assembly. A simple plan of organization has been followed. General officers arrange four-year courses in study and reading, usually preparing special texts for the purpose. Local circles of adults are organized by correspondence. They elect their own officers and meet regularly for study and conference. Diplomas are issued by the general officers upon sufficient evidence that the entire course has been pursued with intelligence. A quarter of a million members have been claimed for the Circle.

Check. See CLEARING HOUSE.

Checkerberry. See WINTERGREEN.

Checkers or **Draughts,** a game of skill. It is played by two persons with twelve disks or men each, on a checkered board of sixty-four squares. The squares are colored in two alternating colors, it matters not what, so that the squares stand in clear



Checkerboard.

contrast. The game is played on the squares of a single color. In the beginning the board is placed so that each player shall have a double corner as 1-5 or 28-32 at his right hand. Each player arranges his twelve men in three rows, so as to occupy the squares numbered 1-12 and 21-32 respectively. The men of one player are called the white; those of the other player, the black. A man may move in either diagonal direction forward, or toward the enemy. Thus white, on 23, may move to 18 or to 19. Black, on 12, may move to 16. When a white man reaches 1, 2, 3, or 4 he has reached the king row and becomes a king. He should be crowned or

doubled by a second disk. He may now move backward. A king at 15 may move to any one of the four squares at its corners; that is to say, 10, 11, 18, or 19. In like manner, a black man reaching 29, 30, 31, or 32 becomes a king. A king is more valuable than a man. Whenever a man finds an adversary on the next diagonal square with a vacant square beyond, he may jump over and take that man, thus removing him from the board. If a white man lay at 19, and a black man at 15, and it were white's turn to move, white might take black by jumping to the vacant 10. The object of the game is to remove the men of one's adversary from the board, or to block them so that they cannot move. When the number of men on each side has been so reduced that there is no hope of either player winning, the game is said to be drawn. Any number of onlookers may be present, but it is considered a want of etiquette to assist either player.

The origin of the game is buried in antiquity. It is an ancient game with the Chinese, and was well known to the Egyptians, Greeks, and Romans. A curious bit of sculpture on the wall of a chamber in ancient Thebes represents Rameses III playing a game of checkers with a goddess. The earliest description of the game in English is dated 1566.

See CHESS; HOYLE; GAMES.

Cheeryble Brothers, The (Charles and Edwin), a firm of London merchants in Dickens' *Nicholas Nickleby*. They are twin brothers, warmhearted, simpleminded, cheerful old gentlemen, friends of the Nicklebys. It is said that Dickens found the originals of these characters in the Grant brothers, cotton-spinners of Manchester. Dickens follows a not uncommon fashion of his own in selecting a name for these brothers, which, by its sound, conveys some impression of the owner's personality. Dickens' prefaces to various volumes of his works are often interesting. The following quotation in regard to the Cheeryble Brothers is from the preface to the first edition of *Nicholas Nickleby:*

> Those who take an interest in this tale will be glad to learn that the Brothers Cheeryble live; that their liberal charity, their singleness of heart, their noble nature, and their unbounded benevolence, are no creations of the author's brain; but are prompting every day (and oftenest by stealth) some munificent and generous deed in that town of which they are the pride and honor.

In the preface to a later edition of the same work, the above paragraph is quoted, with the following addition:

> If I were to attempt to sum up the hundreds upon hundreds of letters, from all sorts of people in all sorts of latitudes and climates, to which this unlucky paragraph has since given rise, I should get into an arithmetical difficulty from which I could not easily extricate myself. Suffice it to say, that I believe the applications for loans, gifts, and offices of profit which I have been requested to forward to the originals of the Brothers Cheeryble (with whom I never interchanged any communication in my life), would have exhausted the combined patronage of all the Lord Chancellors since the accession of the House of Brunswick, and would have broken the rest of the Bank of England.

See NICHOLAS NICKLEBY.

Cheese, a dairy product prepared from curd or coagulated milk. Cheese is less concentrated than butter. It can be kept wholesome for a greater length of time and it saves a larger percentage of the strength of the milk. Homemade cheese is still an important article of produce. When milk is brought to the right temperature, about 84°, liquid rennet is added in sufficient quantities to produce coagulation. Under proper conditions milk separates in from twenty to thirty minutes, into a white curd and a watery whey. The latter is drained off, and, though it contains less food than buttermilk, it is richer than water, and is sent to the swill barrel. The curd is then removed to a chopping bowl and cut into fine pieces, to permit the escape of whey that may be inclosed in air spaces. This operation is performed with a sharp knife of two or more parallel blades like that used in chopping hash. The fine curd is then salted to taste, placed in a cloth, and deposited in a cheesehoop or strong wooden cylinder surrounded with iron hoops, having much the appearance of a half-bushel measure, but without top or bottom. The hoop with its contents is placed on a flat surface in a cheese press. A circular board, fitting like a piston, is placed in the upper end of the hoop, and

pressure is applied for a day or two until what little whey remains has been forced out, and the curd has been pressed into a firm cheese. The cheese is then removed from the hoop and covered with three pieces of cotton cloth, one piece running like a band around the circumference, with a circular piece for each end and all neatly sewed together. It is then anointed with butter and placed on a shelf to cure. Curing cheeses are turned every few days and reanointed. The cloth and ointment are designed not only to keep the cheese in shape and to protect it from becoming soiled, but to exclude the eggs of flies and other insects. Some prefer a cheese three months old, others two or three years.

Cheese manufacture in the United States has become very important in recent years. At the time of the taking of the fourteenth census there were in this country 3,530 establishments capitalized at $26,022,734 and employing 4,808,991 wage earners engaged in the manufacture of this commodity. In that year the factory output of cheese was 473,569,199 pounds, and the farm output 6,371,396 pounds, a total of 479,940,595 pounds. Of this amount, 299,014,028 pounds were made in Wisconsin. In point of production New York was second, but made only 89,479,305 pounds. The total amount represented an increase of 159,408,414 pounds in ten years. The east north central group of states—Ohio, Indiana, Illinois, Michigan and Wisconsin—produces a greater amount of cheese than any other group in the Union.

Canada. In the last few decades Canada has also become important as the producer of comparatively large quantities of a high quality of cheese. Cheddar is the principal make. Among the provinces, Ontario is first in point of production, and Quebec is second. Ontario's 1920 production, 92,784,757 pounds, valued at $24,050,823, represented more than one-half of the Dominion total. Quebec, in the same year, produced considerably less. The two provinces stand in about the same cheese-making relationship as do the American states of Wisconsin and New York. The total Canadian production in 1920 was 149,201,856 pounds.

It is not possible to say how much cheese is made in the world. The chief cheese exporting countries and the number of pounds exported in a recent year were:

Country.	Pounds.
Bulgaria	5,674,170
Canada	189,381,875
France	30,511,968
Germany	2,891,803
Italy	46,607,032
Netherlands	113,648,000
New Zealand	26,525,296
Russia	1,300,061
Switzerland	62,213,331
United States	7,471,452
Other countries	8,114,222
Total	497,209,093

The cheese buying countries with the number of pounds bought by each in the same year were:

Country.	Pounds.
Argentina	7,265,746
Australia	299,711
Austria-Hungary	9,114,789
Belgium	32,278,995
Brazil	3,631,012
Cape of Good Hope	4,761,140
Cuba	5,232,416
Denmark	1,784,642
Egypt	8,650,855
France	46,087,182
Germany	44,760,881
Italy	10,294,042
Russia	3,358,490
Spain	4,396,636
Switzerland	7,048,617
United Kingdom	259,833,392
United States	34,270,604
Other countries	21,296,477
Total	504,333,482

See Butter; Cattle; Adulteration.

Cheese Cloth, a thin, slazy muslin used by dairymen for covering cheeses. It is on the market in varied qualities as regards fineness of thread and closeness of weave. It is bleached or unbleached. Butter cloth is an extra fine quality of cheese cloth. Cheese cloth is used also for curtains, for covering walls before papering, and for a variety of domestic purposes. The "gauze" used by surgeons in dressing wounds is cheese cloth conveniently folded and sterilized. Cheese cloth is dyed in plain colors for draperies and fancy work.

Chelsea, chĕl′sē, formerly a suburb, now a district of London, having somewhat

less than 100,000 people. It is situated on the north bank of the Thames and forms the river frontage of the Hyde Park district. Chelsea Hospital for old soldiers and the Sloan Botanic Garden are of interest. The latter is famed for fine old cedars. To Americans the chief interest of the neighborhood is its literary associations. Swift, Steele, Leigh Hunt, and George Eliot lived here. Locke and Addison lived hard by. Thomas Carlyle and his wife, Jane Welsh Carlyle, lived in a quiet street. A statue of Carlyle has been erected on the Chelsea Embankment. He was known as the "Sage of Chelsea." Chelsea was a favorite haunt of Henry VIII and his sixth queen, Catharine Parr.

Chemistry, the science of the composition of material things. Chemistry aims to answer such questions as, of what are water, candles, air, and grass, in short, all things made? Of how many elements is the world composed, and what is each like? It now enters largely into deciding what constitutes pure food. The subject of chemistry seems to have passed through five stages of development.

The ancients were fairly well agreed, the Greeks learning from the wise men of India, that the world is composed of four elements; namely, air, water, earth, and fire. Air is warm and moist, water is cold and moist, earth is cold and dry, fire is warm and dry. The air is the opposite of earth and water is the opposite of fire. They were also well acquainted with a number of practical operations, such as dyeing, glassmaking, soapmaking and working in gold, silver, copper, iron, lead, and tin. They were skillful in compounding cosmetics, salves, ointments, medicines, oils, paints, ink, perfumes, and poisons. The material of which all these substances, and many others, as wine and vinegar, in fact, the elements of which all substances are composed, were in their opinion, simply air, fire, earth, and water. Aristotle, the greatest gatherer and arranger of knowledge known to antiquity, added a fifth something, he did not know just what, but something outside of the four elements, a moving principle or force of some sort.

The second period in the history of chemistry is the age of alchemy. Wise men believed that iron was formed by water running into a crack of the heated earth; that water became air by fine subdivision; that fire turned to air when it went out; that air turned to mist, and mist turned to earth. Naturally they sought ways of turning cheap substances into valuable ones. The Egyptians, the Greeks, and the people of the Middle Ages were as fond of wealth as we are today. An enormous amount of making and carrying and buying and selling went on much as it does now. Gold and silver were prized. If all substances were at bottom fire, earth, air, and water, or, if not these, some other half dozen elements, and if one substance could be converted into its elements, and then by taking out part of one element or putting in more of another be changed into some other substance, why not become wealthy at a stroke by making gold and silver out of base metals? It is not surprising, then, that the alchemists of Egypt, Greece, Arabia, and of all Europe for a thousand years melted, heated, and stirred, added to and took from, trying to make gold out of sulphur or copper, and silver out of mercury. Many an enthusiast worked with furnace retort and crucible thinking himself on the verge of discovery. Many an imposter announced that the discovery was his. A feverish belief prevailed that the secret was out. If not known here, it certainly was known yonder. Fortunes were sunk in hopes of multiplying them. Needy princes borrowed and bestowed on alchemists that their coffers might be filled with streams of shining gold. Sir Walter Scott uses this delusion with good effect in describing the character of Dousterswivel in the *Antiquary*. Alchemy now seems to us a feverish craze, but in reality it was quite as sensible as many get-rich-quick schemes of the present day. The chief feature to be regretted is that men of science wasted their time so long and were diverted from making progress.

The third period of chemistry is noted for a theory that disease can be cured by chemicals. This theory came into vogue

shortly after the discovery of America, and was part of the general stir of that time. The theory in brief is that the human body is made up of certain chemical materials, and that disease and illness are due to wrong relations between these elements—too much of one or not enough of another—and that it is the proper business of the physician and chemist to discover and administer the medicine that will establish harmony. One writer thought that these constituents of the body were mainly mercury, sulphur, and salt. Too much sulphur gave rise to fever and the plague. An excess of mercury in the system was indicated by paralysis and depression, while diarrhoea and dropsy were due to an over supply of salt. In cases of dropsy the apothecary must take salt out of the system, or put in more mercury and sulphur. Of course, alchemy still ran its course; but the new theory of chemistry was a distinct step forward in that it proclaimed a higher motive. The chemist spent his time in making medicines rather than gold, and led the way to a more critical study of the nature of various plants and minerals with a view to their use as remedies. Chemical laboratories in the modern sense of the word, laboratories for investigation, date from this period.

The next period in the development of chemistry is the phlogistic period, during which a new theory of fire or combustion prevailed. According to this theory, fire is the outrush from burning stuff of phlogiston or fire material. Thus, when a piece of coal burns the fire material is escaping. When this has all escaped ashes remain. A piece of wood, then, is made up of ashes and of this phlogiston, or fire material. The more nearly a substance could be consumed the more nearly it was composed of pure phlogiston. If the phlogiston and the coal ash could be brought together again, a piece of coal would be the result. This theory was acceptable by reason of fitting into so many experiments. It was held by all the eminent scientists of that period. In one respect, however, the theory was not satisfactory, and that defect led to its downfall and to the ushering in of the period of modern chemistry.

Coal and wood heated in an open retort do indeed throw off a something, be it phlogiston or what we please to name it. Whether the wood chars slowly or bursts into a flame, all that is left is a trifle of ashes almost as light as air. With coal and many other combustible materials the result is the same and was satisfactorily explained by the theory that phlogiston or fire material had been driven out by heat; but when iron or any other metal, that was not vaporized by heat, was subjected to intense heat in an open crucible, just as wood was heated, the metal grew heavier instead of lighter. Instead of driving off phlogiston, heat seemed to have added something to the metal. It seemed as though heat drove the greater part of wood and coal out to unite with something in the air, and that heat invited that something in air to enter iron and other intensely hot metals. When oxygen, that something in the air, was actually discovered and described, even though by men who were unaware of the service they were performing, the foundation of modern chemistry was laid and has not been shaken seriously since. According to modern ideas, the mystery of fire which had been a puzzle for centuries is simply the uniting of the substance, usually some form of carbon, with the oxygen of the air. Metals, intensely heated, attract oxygen, thus gaining in weight.

Chemistry now recognizes, not four elements, but over twenty times that number. Air is a mixture of several elements, water is a combination of two elements, separately invisible; fire is the uniting of two elements; and earth contains all the elements. Instead of striving to change iron and copper into gold, and mercury into silver, chemists now teach that, although elements may be combined into an infinite variety of substances, gold and silver and iron and mercury and many other substances are simple elements, and that no element can be destroyed or changed into another element. At the very basis of modern chemistry is the theory that each element, and hence the world, is made up of infinitely small particles, called atoms; far too small to be seen singly even

under the most powerful microscope. These minute atoms are of different kinds —oxygen atoms, hydrogen atoms, copper atoms, iron atoms, gold atoms, sulphur atoms, silver atoms—all different. Atoms are exceedingly sociable and cling together in infinitely small groups called molecules. An atom will not leave the company of its associates unless thrown in with company it likes better. If similar atoms unite, we have an element, gold or oxygen, etc. If dissimilar atoms unite, as when atoms of hydrogen unite with half as many atoms of oxygen, we have a compound—in this case, water. An atom is unchangeable. Atoms of copper may shift about and be mixed as molecules today with zinc to form brass, and tomorrow be combined with chlorine to form a white powder; or they may combine with vinegar to form green, poisonous verdigris; but atoms of copper are still atoms of copper, and they are never anything else. The number of atoms of gold never changes. All the skill of man cannot make a gold atom or blot one out of existence.

The following table gives the names of elements with symbols and the theoretical weight of an atom as compared with the weight of an atom of hydrogen:

Name	Symbol.	Atomic Weight.
Actinium		
Aluminum	Al	26.9
Antimony	Sb	119.5
Argon	Ar	40.?
Arsenic	As	74.45
Barium	Ba	136.4
Beryllium	Be	9.0
Bismuth	Bi	206.5
Boron	B	10.9
Bromine	Br	79.34
Cadmium	Cd	111.55
Caesium	Cs	131.9
Calcium	Ca	39.8
Carbon	C	11.9
Cerium	Ce	138.0
Chlorine	Cl	35.18
Chromium	Cr	51.7
Cobalt	Co	58.55
Columbium	Cb	93.0
Copper	Cu	63.1
Erbium	E	164.7
Ethereon?		
Fluorine	F	18.9
Gadolinium	Gd	155.8
Gallium	Ga	69.5
Germanium	Ge	71.9
Glucinum	*See Beryllium*	
Gold	Au	195.7
Helium	He	4.?
Hydrogen	H	1.0
Indium	In	113.1
Iodine	I	125.89
Iridium	Ir	191.7
Iron	Fe	55.5
Krypton	Kr	59.?
Lanthanum	La	137.6
Lead	Pb	205.36
Lithium	Li	6.97
Magnesium	Mg	24.1
Manganese	Mn	54.6
Mercury	Hg	198.5
Molybdenum	Mo	95.3
Neodymium	Nd	142.5
Neon	Ne	20.?
Nickel	Ni	58.25
Niobium	*See Columbium*	
Nitrogen	N	13.93
Osmium	Os	189.6
Oxygen	O	15.88
Palladium	Pd	106.2
Phosphorus	P	30.75
Platinum	Pt	193.4
Polonium		
Potassium	K	38.82
Praseodymium	Pr	139.4
Radium	Ra	225.?
Rhodium	Rh	102.2
Rubidium	Rb	84.75
Ruthenium	Ru	100.9
Samarium	Sm	149.2
Scandium	Sc	43.8
Selenium	Se	78.6
Silicon	Si	28.2
Silver	Ag	107.11
Sodium	Na	22.88
Strontium	Sr	86.95
Sulphur	S	31.83
Tantalum	Ta	181.5
Tellurium	Te	126.5
Terbium	Tr	158.8
Thallium	Tl	202.61
Thorium	Th	230.8
Thulium	Tm	169.4
Tin	Sn	118.1
Titanium	Ti	47.8
Tungsten	W	182.6
Uranium	U	237.8
Vanadium	V	51.0
Xenon	X	128.?
Ytterbium	Yb	171.9
Yttrium	Y	88.3
Zinc	Zn	64.9
Zirconium	Zr	89.7

INDUSTRIAL AND AGRICULTURAL. Industrial or practical chemistry, which deals with the uses of chemistry in the arts and manufactures, is an important branch of the science. The whole art of engineering, for example, is based on physical and mechanical science, but the materials em-

ployed in this art are dependent in some degree on the science of chemistry. The materials of construction cannot be used intelligently unless the engineer has a proper knowledge of their physical powers of withstanding stresses and strains, as well as of their chemical properties, including their internal structure and power of resistance to air, fire, water and other agencies. In the manufacture of steel by the Bessemer process of forcing a blast of atmospheric air through molten cast iron; in the open-hearth process, which decarburizes iron without contact with solid fuel; in the production of many varieties of steel including alloys of special hardness; and in the production of titanium, tungsten, aluminum and vanadium, we see the practical results of the chemist's work among the metallic elements, producing materials suitable for gun barrels, locomotive tires and springs, armor plate, armor-piercing projectiles, automobile and airplane engines, fine tools, and many other items of modern manufacture. And this useful development of chemistry, allied as it is with metallurgy, its sister science, is but one of the many important functions it performs in industry.

The modern chemist has been well called a creator. The marvelous products of coal, for instance, are the fruit of chemical science. Coal, as used for gas-making, yields, in addition to gas for household and industrial purposes, a certain amount of watery ammoniacal liquor and tar, which pass over in a vaporous condition and are condensed, leaving coke in the retorts. The coal tar is afterward distilled and yields an average per ton of approximately 5 gallons ammoniacal liquor, 6 gallons crude naphtha, 26 gallons light oil, 17 gallons creosote oil, 38 gallons anthracen oils, and 12 hundredweight of pitch left behind in the retorts. It is from these primary distillates of coal tar that so many explosives, drugs, dyes and disinfectants are produced. The pitch left in the retorts is equal to about 60 per cent of the whole tar, which is said to contain in all some 200 different compounds. The distillation of anthracene oil, one of the tar products, produces anthracene, used in the manufacture of aniline colors, which, in the form of dyes, are of essential value in the textile and other industries.

One reason for calling the chemist a creator is that he has been able to build up artificially products that were formerly regarded as exclusively natural productions. This branch of the science is called chemical synthesis. By this means we now have artificial reproductions of natural oils, or imitation products that closely resemble those of nature. Thus we have artificial indigo, formerly the product of the indigo plant; artificial sepia, formerly derived from the cuttlefish; also synthetic sugar, caffein, vanilla, and many other compounds in daily use. Instead of using flowers, the perfumer employs the chemist to make his perfumes by chemical synthesis. The saccharin of commerce, a chemical product, is several hundred times sweeter than sugar, yet is not a sugar at all and has no nutritive value. Rubber can be made by the chemist from the fusel-oil yielded by potato starch, and a few years ago artificial rubber tires that had run a thousand miles on automobile wheels were exhibited in New York; this process, however, is not yet used commercially. But we have many brands of butter that never saw a cow, and animal fats are being largely displaced in many uses by vegetable fats. In the making of paper from wood-pulp, and additional uses of plant cellulose, in the manufacture of paper cups and other articles, as well as in "mercerized" cotton and artificial silk, we can see plainly the hand of the industrial chemist, the modern prototype of the alchemist of old. From cellulose the chemist has derived guncotton, which is cellulose treated with nitric acid in the presence of sulphuric; collodion, much used as "new skin" and in camera and moving-picture machine films, and which, when mixed with nitroglycerine, gave the world the first of the high explosives of modern warfare; and celluloid, the material of a thousand articles in every-day use.

But the usefulness of industrial chemistry does not stop with improving the materials of construction, or imitating the products of nature by chemical synthesis. It has taken much of the waste of the world

and given it value by transforming it into useful commodities, even foods. Cotton-seed, for example, was formerly thrown away or burned when the cotton of commerce was gathered from the fields. Chemistry has rescued it from the wasteheap and makes of it many useful products, including corn-oil for table use, cotton meal for cattle feed, fertilizers, soap, smokeless powder, putty, varnishes and writing-paper. The era of industrial chemistry has given us literally hundreds of things that the world never saw before; and in realization of this fact, every important industry now has its chemical laboratory.

Agricultural chemistry is that branch of chemical science which deals with the problems of the soil, and includes knowledge of the nutrition of plants and animals, the composition of their products, and the value of the latter as food for man and beast. Many people have come to think of chemistry as purely a laboratory science, the workings of which are shrouded in mystery; and they think of chemicals as so many liquids, powders and crystals confined in bottles and stowed away on the shelves of the drug store. The science has been regarded as too difficult for ordinary comprehension and the materials too complicated for our grasp. Such, however, is not the case. Chemistry is indeed a wonderful science, but its processes are taking place all around us, and its compounds exist everywhere. The air we breathe is a mixture of chemical elements and compounds, the water we drink is a chemical compound, the solid earth beneath us but a conglomerate mass of many chemicals. The plants which grow upon the surface of the earth are composed of only a few chemical substances, and the animals which feed upon the plants (and upon other animals) are but chemical compounds wrought in nature's laboratory by that mysterious process called life.

Some of the chemical elements of great importance in agriculture are those entering into the structure of plants and those composing plant-made life. Knowledge of these elements shows the intimate relation between the plant, the air and the soil; and there are a few chemical terms which must become household words if the principles underlying agriculture are to be understood. The simplest study of agricultural chemistry consequently deals with the following topics: (1) Those elements and compounds, called plant foods, which are essential to the growth and development of the plant. (2) Those compounds, called plant products, which are formed by the plant out of the food which it consumes. (3) The three sources of plant food, namely, the soil, the air and the water. (4) The meaning and the importance of the terms "acids" and "alkalis." (5) Methods of treating soils which are abnormally acid or alkali.

As to plant food, it is well known that a little plant is to be found in every perfect seed. When the seed germinates, this plant lives principally on the food material stored in the seed until it develops roots and leaves. It is then able to take in food from the air through its leaves, while its roots absorb from the soil other food materials dissolved in water. Water transports the plant foods upward from the roots toward the leaves, and out of its food materials the plant manufactures starch, sugar, oil, protein, fiber and cellulose, compounds which go to make up the plant structure. Starch, sugar, oil and protein are digestible and furnish food for men and animals. Fiber and cellulose are the indigestible parts of the plant.

From the air the plant takes in oxygen and carbonic-acid gas through the breathing pores of the leaves, but the leaves do not use the nitrogen of the air. This essential and most expensive of plant foods is taken in by the roots of plants. Small quantities of nitrogen exist in soils in a form known as nitrates, which dissolve readily in water and enter the plant through its roots in company with the other plant foods. Most of these plant foods are available in the soil in great abundance, but it is sometimes necessary to supply nitrogen (in the form of nitrates), phosphoric acid and potash. These are called fertilizers and are the only plant foods which the plant ever has difficulty in getting. The other plant foods are lime, oxide of iron (iron rust), soda, magnesia, silica (largely

sand), hydrochloric acid and sulphuric acid. When the chemist makes a complete analysis of a plant, he first dries it at the temperature of boiling water, and the loss in weight is water. He next burns the plant, which causes the carbonic acid, oxygen and nitrogen to pass off, and he traps these gases and weighs them. Finally he analyzes the remaining ash. In this way it is easy for him to learn just what substances are used by the plant in its growth.

The soil is sometimes called the storehouse for plant food. Its composition varies so greatly that there is no such thing as an average soil. But there are many substances which exist in nearly all soils, and by taking an average of many chemical analyses the chemist can get a good idea of what he may expect to find in a fertile soil. Remembering that nearly all soil substances are plant foods, but that the three essential fertilizers—nitrogen in the form of nitrates, phosphoric acid and potash—constitute only a very small percentage of the soil, we shall see the necessity of adding fertilizers in many cases.

There are three classes of soluble compounds in the soil, namely, acids, alkalis and salts. The acids are characterized by their sour taste, and by other properties known to the chemist. Lime, magnesia, soda and potash are the principal soil alkalis. The other soluble compounds are called salts. An alkali is a substance having power to combine with an acid, and the product of this combination is called a salt. For example, potash is an alkali. If potash be added to a dilute solution of nitric acid, the salt known as saltpeter is formed. If the potash be added in the right amount exactly to neutralize the acid, the saltpeter may be collected by the evaporation of the solution to dryness in exactly the same manner as in the preparation of potash. Numerous chemical changes, due to the liberation and recombination of acids and alkalis, are continually taking place in the soil; and plants will not grow well in a soil that has too great an excess of either acid or alkali.

The alkali soils of the West are made fertile by running water on them from the top and draining it off from the bottom through tile drains. To show that this method removes alkali, a simple experiment will suffice. Prepare an alkali soil in a tin can with holes in the bottom through which the water may escape. Set this can in another dish, pour water onto the soil from the top, and test that which drains through by the use of litmus or cochineal. A blue color of the indicator produced by this drainage water shows that the alkali is being washed out of the soil.

To test soils for acidity or the presence of alkali, boil a sample of the soil to be tested in a small quantity of water; allow it to settle, and when perfectly clear pour off the clear water into a white dish and test it with both blue and red litmus paper. If the soil was acid, blue litmus paper will turn red; if it was alkaline, red litmus paper will turn blue. Allow a little time, 5 or 10 minutes, for the litmus paper to change color. If litmus paper is not available, the same test may be made with cochineal, which may be purchased at any drug store, pulverized, and dissolved in a small quantity of alcohol, to form an indicator. Neutral soils—that is, those which are neither acid nor alkaline—will have no effect upon the color of either indicator, the litmus paper or the cochineal.

Lime, wood ashes, etc., will sweeten a "sour" soil, and from the foregoing it will be seen how chemistry may be utilized in agriculture to increase the fertility of the soil by furnishing it with the essential foods required by the growing plant; and also to determine whether certain soils are or are not suitable for the growth of the crops which it is desired to raise upon them. These are services of immense benefit to humanity; and modern scientific farming may be said to be based on chemistry.

See also PURE FOOD; WILEY.

Chemnitz, one of the chief manufacturing towns of Germany, situated in a fertile valley in Saxony, at the base of the Erzgebirge, on the river Chemnitz, about fifty miles southeast of Leipsic. The city consists of an old inner town, in the form of a circle, which has narrow streets, and this in turn is surrounded by modern suburbs. It has many fine squares and public places, among which are the Hauptmarkt,

the Königs-Platz, the church of St. Peter and the Royal Technical Schools. The noteworthy buildings include the church of St. James, dating from the fifteenth century, restored in 1880; the new Rathaus, post office, Imperial bank, Central Railway station, the large cattle market and a castle. The city is the seat of government of the district, and it owns the public utilities.

Chemnitz was destroyed during the Thirty Years' War, but later its old prosperity was revived. Population, 1919, 303,-775.

Chemnitz, Chemnitius, Martin, (1522-86), was born in Treutenbrietzen, in Brandenburg, and studied at Frankfort-on-the-Oder and Wittenberg. In 1548 he became rector of the cathedral school at Königsberg. In 1553 he went back to Wittenberg where he met Melanchthon and delivered lectures on theology, which are amazing for the erudition they display. In 1554 he became a preacher in Brunswick, where he wrote several books, in one of which he argued with much acuteness against the dogmas of the Church of Rome. His *Corpus Doctrinae Prutenicum* is a standard work on divinity among the Protestants of Germany. But his greatest work was that of inducing the Saxon and Swabian churches to adopt as their confession of faith the *Concordienformel,* thus extending the creed of Luther.

Cheops, kē′ŏps, the Greek name of the Egyptian king Khufu, who lived about 2500 B. C. and is famous as the builder of the Great Pyramid. He was the second king of the fourth dynasty of the Old Egyptian Empire. Cheops has been identified with Suphis or Shufu, a name appearing on certain Egyptian monuments. He is mentioned by some four or five other names in the works of early historians. The accounts of his character and life differ almost as much as his names. By some he is depicted as an impious man who closed temples and forbade the worship of the gods. The monumental inscriptions, however, represent him as building temples and repairing shrines. Whatever his life may have been, his tomb has stood for thousands of years, the greatest structure on earth. See PYRAMID.

Cherbourg, France, a fortified seaport at the mouth of the Divette River in the department of La Manche (The Channel), 196 miles N. W. N. of Paris. The city of Cherbourg is a naval station, and is notable for the extensive fortifications by which it is surrounded. These altogether cost $8,000,000. Foremost among them is the *digue,* or breakwater, which stretches across the entrance to the roadstead. It is over two miles in length and of massive construction. Then there is the Fort Chavagnac, at the West entrance to the harbor, which latter the large ships of war make use of. The Port Militaire has three great basins for war vessels—an outer, accessible at all times for vessels of the largest class; a floating basin communicating with this by gates; and a third, communicating with this by similar gates.

The commercial town is modern, the streets are wide and well paved, but it is not particularly interesting. The principal industry is centered in the dockyard, manufactures and commerce being small. Cherbourg is supposed to occupy the site of a Roman station, Caesaris Burgum. The English held possession of it until 1200. Population, 1921, 43,731.

Cherokee, chĕr-ō-kē′, a tribe of North American Indians belonging to the Iroquois family. They were formerly in possession of the upper valley of the Tennessee and Cumberland Rivers. They lived in log huts and had about sixty-four towns. They sided with the British during the Revolution, but at its close acknowledged the sovereignty of the United States. After the war they began to move westward. Those in Georgia were driven out by the whites with the aid of government troops. In 1808 the Cherokee nation was organized. A tract of land in Indian territory was set aside for them. The Cherokees proved very teachable, schools and missions were established among them, they learned various trades and several kinds of manufacturing, and up to the outbreak of the Civil War held slaves. There were Cherokees in both the Northern and Southern armies, and by both armies their country was ravaged. In 1906 the Cherokees and the four other civilized tribes terminated

their tribal organizations and were received as citizens of the United States. See INDIAN TERRITORY; CHICKASAWS; CHOCTAWS; SEMINOLES; CREEKS.

Cherry, a fruit tree belonging, with the plum, to the rose family. Our garden cherries are from European stock. Cherries are cultivated as far north as the southern part of Norway. In Germany and other continental countries cherry trees line the roadsides. The fruit is sold to a contractor. The pickers use long step-ladders in their work; they refer tourists to the foreman who very politely sells them at a moderate price as many large, black, meaty cherries as they want to pay for. We have several American wild cherries. The black cherry is a large tree in many localities. The fruit is bitter. The wood is used for expensive furniture. The wood of the red cherry also is desirable, but the tree is too small for lumber. A dwarf sand cherry sometimes fruits when less than a foot high. The choke cherry, with cylindrical clusters, comes in the fall after birds have taken the red cherries, and is welcome in spite of its puckering qualities.

Several proverbial expressions show that cherries have had a place in homely life for centuries. "As like as two cherries," is expressive of similarity. "Making two bites of a cherry," is a sermon on unnecessary effort. "As red as a cherry," and "cherry red," indicate the favorite kind of cherry. *Cerise,* the name of an exquisite color, is French for cherry.

Sweet cherries and sour cherries are cultivated thoughout the apple states as door-yard and orchard fruits. In California cherries are subordinated to other fruits, yet many cars of fresh cherries and a great number of cases of canned cherries are shipped during the season.

There are a number of fungus diseases which attack cherry trees, some of which are also common to other fruit trees, as the brown rot on peach trees, and the leaf spot and black knot on plum trees. A frequent disease of the cherry is mildew, which is caused by a fungus growth, also found on the apple, especially in nursery stock. The leaves affected become gray with the fungus, and they dry and fall from the tree. Leaf curl and scab, due to fungi, are rather common, and usually yield to energetic spraying. There is also a common leaf scorch in Europe, somewhat rare in America, which withers the leaves, though they remain on the trees all winter. Relief is generally brought about by burning the leaves for two seasons in succession. To be successful this must be practiced over quite a large area, since the winds can carry the disease to quite a distance.

Cherry Laurel, or **Laurel Cherry,** a common name for certain evergreen species. They bear racemes of fruit, resembling that of the almond, and as a rule have white flowers. The kernels and leaves of the cherry laurel are poisonous, though they are used sometimes for flavoring purposes. By distillation, an oil is procured from the leaves. The product is known as cherry laurel water, and was formerly used by pharmacists. The common cherry laurel is a native of southeastern Europe and the part of Asia adjacent thereto. It grows in the form of a shrub and reaches a height of 10 feet; it has shining yellowish-green leaves, and is much used for ornamental purposes in Europe. It is rarely seen in the northern part of the United States, except in greenhouses, but in California and in the South it is frequently met. Another European species is the Portugal cherry laurel, which often attains a height of 20 feet. The wild orange, in the South known as the mock orange, is the best known of the American cherry laurels. It is much prized for its beautiful, glossy foliage, and for the creamy racemes of flowers which it bears. These flowers usually appear in March. All the species named usually thrive well in the shade, with the exception of the Portugal cherry laurel, which requires much sunshine.

Cherub (plural **Cherubs** or **Cherubim**), angels of the second order, that is, celestial beings who, in the hierarchy, are placed next in order to the seraphim. The many descriptions which the Scriptures give us about these spirits differ from each other, as they are variously described as being in the shapes of men, eagles, oxen, lions, and a composition of all these to-

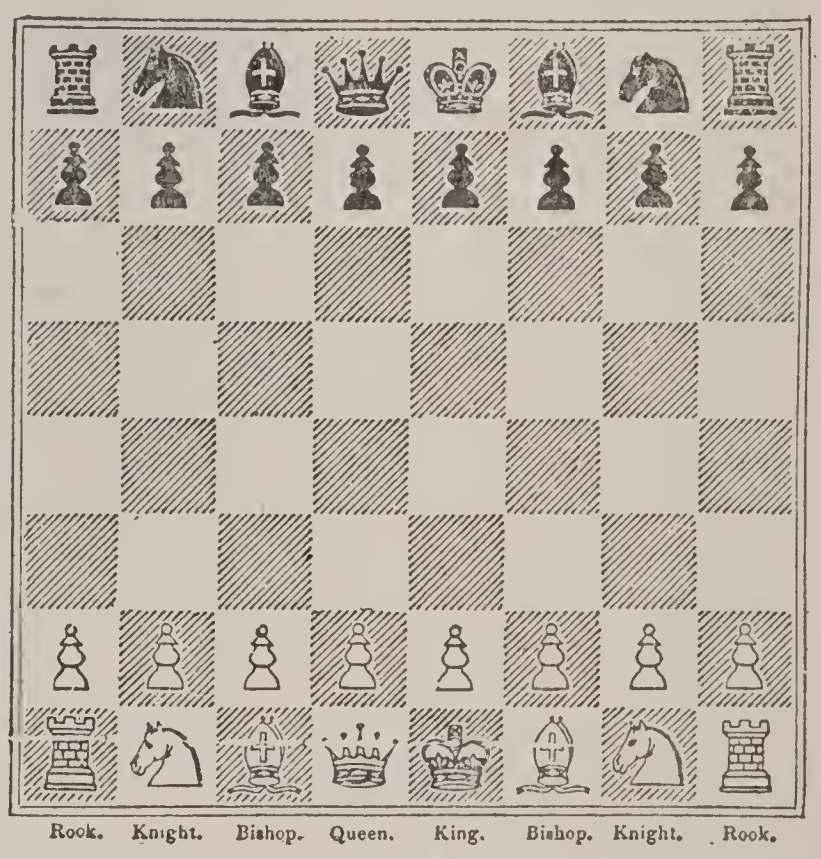
gether. The hieroglyphical representations in the embroidery upon the curtains of the tabernacle, as ordered by Moses, (Ex. xxvi:1), were to be "cherubims of cunning work," executed by skillful workmen.

Cherubini, Maria Luigi Carlo Zenobio Salvatore (1760-1842), an Italian composer, was born at Florence. He is best known for his sacred music. In 1773, he produced a *Mass,* and in 1776 a *Te Deum* and an oratorio. In 1780, he produced his first opera, *Quinto Fabio*, and by 1784 he had produced eight operas in the theatres of Italy. In 1805, Cherubini went to Vienna to write an opera for the Imperial Opera House, and from that time his fame became general. After 1809, he devoted himself to sacred music almost exclusively. In 1814, he was made a Knight of the Legion of Honor. Cherubini visited London, and was made composer to the king; and in 1821 was made director of the Paris Conservatory. He was the author of a work on counterpoint that is still standard.

Chesapeake and Ohio Canal, a waterway 184 miles long extending along the north side of the Potomac River from Georgetown, a part of Washington, D. C., to Cumberland, Md. As early as 1774, Washington entertained the idea of making the Potomac a navigable stream from tidewater to the Alleghanies. Washington's plans were set aside by the Revolution. In 1784, however, a company was formed for the purpose of canalizing the river; of this company Washington was the head until he was chosen President. Various difficulties met by the projectors of the plan resulted in its abandonment in 1820; but in 1850 it was again taken up, and carried to completion. The cost of the canal was more than $11,000,000. The canal is sixty feet wide and six feet deep; it has seventy-four locks with a total lift of 609 feet.

Chesapeake Bay, the largest inlet on the Atlantic Coast. It is 200 miles long and from 4 to 45 miles in width. It lies within the borders of Virginia and Maryland. The promontories of Capes Charles and Henry at its entrance are twelve miles apart. The bay is of great depth. It receives the waters of the James, the York, the Rappahannock, the Potomac, the Susquehanna, and many smaller streams. Newport News, Alexandria, Washington, Annapolis, and Baltimore are situated on its borders, or at the head of estuaries. The waters of the Chesapeake are famous for the finest oysters and terrapin in the world. The reedy shallows are the haunt of innumerable waterfowl, including the celebrated canvasback duck. Shooting is carried on chiefly from blinds or reed-covered boats. See BALTIMORE; OYSTER; POTOMAC.

Chess, a game of skill played on a checkered board of sixty-four squares. The game is said to be of Hindu origin. It was played in Hindustan 5,000 years ago.



CHESS BOARD.

The Arabs learned the game from the Persians and introduced it into Spain and western Europe. The board resembles a checkerboard; all the squares are used. Each player has sixteen men, consisting of eight pawns and eight pieces, known as the whites and blacks. The pieces are the king, the queen, two bishops, two knights, and two castles, or rooks. They are arranged as shown below.

The pieces on the queen's side are known as the queen's bishop, queen's knight, and queen's rook; those on the other side bear the king's name. The

pawns are named by the pieces in front of which they stand. Thus we have the king's pawn, the queen's pawn, the king's rook's pawn, the queen's bishop's pawn, etc. The white queen stands at the left of her king; the black queen at the right of her king; so that corresponding pieces are opposed to each other. In chess, men may be taken, not by leaping over them, as in checkers, but by occupying the space in which they stand. The intricacy of the game is increased greatly by the varying powers possessed by the different men.

A pawn moves forward only. The first move may be for one or two squares; subsequent moves for one square only. A pawn may take any man belonging to the enemy by moving one space diagonally to the square occupied by that man. A knight has eight moves,—two squares forward, and one square sideways in either direction; two squares backward and one square sideways in either direction; two squares to the left and one square either forward or backward; and two squares to the right and one square either forward or backward. As a knight may leap over any intervening man it is evident that he can remove a man of the enemy from any one of eight spaces.

A bishop moves angularly any number of spaces forward or backward on the color on which it was originally placed.

The rooks move any number of spaces, as far as the line is clear, either forward, backward, or sideways.

The queen has the moves both of bishops and of rooks.

The king may move in any direction, one square at a time (except in castling). Each king is permitted to castle once during the game. The player moves his rook to the square next the king, then leaps his king over the rook to the square on the other side.

A player is not compelled, as in checkers, to take a man within reach; but may refuse, if to his own advantage. When the king is situated so that he can be taken at the next move by an adversary's man, he is said to be in check. If the player be unable to avoid the attack by taking the attacking man, interposing one of his own men, or retiring the king to a place of safety, he is checkmated, and loses the game. Any man properly situated may attack the opposing king. The king is also able to take any man of the enemy. If neither player is able to checkmate his opponent's king, the game is drawn.

It is not practicable to explain the rules of chess in a brief article, but a full explanation with illustrative games may be found in Hoyle's Book of Games.

Chester, an ancient English city six miles on the road from Liverpool to London. It stands on a sandstone hill. It is laid out in the form of an oblong, and is surrounded by a wall of sandstone blocks seven feet in thickness and wide enough on top for two or three persons to walk abreast. Chester is one of the few English cities where the old medieval walls are still practically in complete repair. The

Next to the Roman antiquities in interest is Chester Cathedral. The ground plan is that of a cross. The main body is 355 feet long by 75 feet wide. The transept is 200 feet long. The vaulting rises to a height of 78 feet. The exterior has notable ranges of windows and is marked by a square central tower. The cathedral is of special interest in that it combines every variety of English medieval architecture from Norman to the latest pointed style. Architectural contrasts have been combined attractively and create an agreeable impression.

The two main streets of Chester cross each other at right angles and terminate in massive gates. These streets were excavated by the Romans to a depth of eight or ten feet below the general level. Rows of houses, half timber, half mortar work, with curiously carved gables, are reached by steps from the street below. The upper story of each house projects about sixteen feet over the lower story, and is supported by pillars, thus forming a covered colonnade or footway running the entire length of the street. All in all, Chester is one of the most peculiar and interesting cities in England. Tourists landing at Liverpool run to Chester and stay over for a night on their way to London. The town is the seat of Cheshire County, a rich agricultural region, famous

for Cheshire cheese. The population of the city in 1921 was 40,794.

Chester, Pa., is on the Delaware River, 15 miles south of Philadelphia. It was settled by Swedes in 1643, under the name of Upland, and is the oldest city in the state. William Penn gave it its present name in 1682. It is notable as the site of the first Pennsylvania Assembly, in 1682. General Washington reassembled his troops here after the battle of Brandywine, in 1777. Chief among the city's industrial plants are the Roach Shipyards, builders of several vessels for the United States Navy, foundries, machine shops, and cotton and woolen mills. It contains good graded and high schools, as well as Swarthmore College, Chester Academy and the Pennsylvania Military College. Population, 1920, 58,030.

Chesterfield, Earl of (1694-1773), an English officeholder. He held various positions under George I, as gentleman of the bedchamber to the Prince of Wales, ambassador to Holland, and lord lieutenant of Ireland. He wrote essays, critical and humorous, as well as a series of letters to his son,—little essays full of worldly wisdom, shrewd advice, caustic comment, and insincerity. Though unprincipled, he was eloquent in his manner, and posed as a patron of letters. He pretended to encourage Samuel Johnson in the publication of his dictionary. When Dr. Johnson became convinced of the earl's duplicity he finished the work without his aid. At its publication Chesterfield attempted to revive the old relationship. Dr. Johnson published an open letter to him, which is considered the most scathing and caustic of the sort in literature. A single sentence must suffice by way of quotation:

> Is not a Patron, my Lord, one who looks with unconcern on a man struggling for life in the water, and, when he has reached ground, encumbers him with help?

Chesterton, Gilbert Keith (1874-), an English novelist, poet and essayist, one of the most original of modern British writers. Among his recent works are, *The Victorian Age in Literature*, *The Flying Inn, Irish Impressions,* and a play, *Magic.*

Chestnut, a nut-bearing tree closely related to the oaks and beeches. A flattening of the sides of the fruit is due to their clustering two to three in a cup. The European chestnut is larger and coarser in taste than ours. The Japanese nut is smaller and of inferior quality. The American chestnut is a straight forest tree, 100 feet in height, with cream colored, heavy scented flowers, accused of causing hay fever. The flowers appear in June and July. After heavy autumn frosts the rough prickly burs, which correspond to acorn cups, open and "the sound of falling nuts is heard." Two dwarf chestnuts, or chinquapins, the one, in the main, eastern, and the other southern, bear a solitary nut in each bur. They are earlier than the tree chestnut.

Cheviot Hills, a mountain range on the border line between Scotland and England. A central peak, to which Scott refers in his Marmion as "Cheviot's mountain lone," is 2,676 feet high. It stands 500 feet in the clear above Carter Fell, the next in height. The head waters of the Liddel, the Tyne, and some of the branches of the Tweed have their sources here. It is a fine grouse country, and, until recently, a haunt of the golden eagle. The upland pastures have given rise to a fine breed of sheep called cheviots, whence the name for a loosely woven woolen cloth used for suitings. The region is celebrated in story and song as the scene of border forays. Scott

Chevy Chase, chĕv′ĭ chās, a famous old English ballad of border warfare. The incidents recounted are not regarded as historical, although the story is probably founded on some actual encounter between Percy and Douglas. It has been confounded with the Scotch ballad, *The Battle of Otterbourne,* as the events celebrated are similar. There are two versions of the ballad. The older one is sometimes called *The Hunting of the Cheviot.* Both versions may be found in Percy's *Reliques.* The name Chevy Chase has been variously explained, as a corruption of a French word meaning *a raid,* and as derived from the name Cheviot Hills, and meaning the Cheviot hunting ground. See BALLAD.

Chewing Gum, a masticatory consisting either of a natural resin or gum-resin, like that of spruce, or an artificial preparation of chicle, paraffin, etc., with flavoring ingredients, much used in the United States. Chicle, an elastic gum derived from the milky juice of an evergreen tree which grows abundantly in Southern Mexico, Yucatan, Central America, British Honduras, and adjacent South American countries, is most extensively used in the manufacture of chewing gum. The United States uses practically the entire product of chicle for this purpose.

The chicle chewing gum business forms an interesting chapter in American industrial development. Its beginning dates back to 1860, when Thomas Adams began manufacturing the first chicle gum on a total investment, it is said, of $55. The product at once became popular because chicle not only chews easily and satisfactorily, but compounds readily with sugar and flavorings into a pleasant confection. In little more than sixty years the chicle chewing gum industry has made phenomenal progress, and at present ranks among the important American industries. The manufactured output in 1920 was valued at $57,000,000, representing a retail business of $100,000,000.

Ingredients. Before the advent of chicle gum, those who chewed gum used for the purpose lumps of native spruce resin or preparations of sweetened paraffin wax and oil-softened resin sold in the form of convenient sticks. The American habit of gum-chewing is now rapidly extending in other countries, notably among the populations of South America, Australia, New Zealand, and in lesser degree in England and France. It is regarded as a harmless relief for nervous tension, making concentration of attention easier; and for that reason the United States War Department ordered chewing gum listed as a ration and distributed to American soldiers during the European war. This fact served to advertise and extend the habit among the people of England, France and Belgium.

Crude chicle is quite hard, brittle and easily reduced to fragments. It melts very readily with heat, being easily softened when held in the mouth. When warm it is very ductile and adhesive, without perceptible odor or taste, and is entirely free from any injurious qualities. A number of other gums are regularly cleaned and blended as substitutes for chicle, and are also largely used in chewing-gum manufacture. These include waxes, resins, and balsams of various sorts. The aggregate tonnage of these compounded gums annually employed in the chewing-gum industry probably equals and perhaps exceeds that of the pure chicle used. Comparatively little chewing gum in fact is made of a purely chicle base, and much is made containing no chicle whatever.

Manufacture. The machinery equipment of a modern chew-gum factory includes such rubber-working machinery as washers, mixers and kneaders, and some machines used in candy-making; but most of the machinery is specially designed for making chewing gum. The blocks of crude chicle are first broken into lumps and dried, then reduced by choppers and grinders to a size resembling that of rice. All foreign matter is carefully removed, for any kind of grit spoils the smoothness of the gum for chewing, and the final work of cleaning chicle and the substitute gums used is done by a remarkable filtering machine. All the gum ingredients are then placed in a mixing cylinder, melted under pressure, and mixed by a geared screw. The hot filtered fluid mixture, thoroughly sterilized, is then drawn into receptacles in weighed amounts, and transferred to a tilting, steam-jacketed mixing kettle, or dough mixer, for mixing with selected sweetening and flavoring ingredients. These are glucose, caramel paste, powdered sugar and flavoring extracts, added to the melted gum in fixed order. The temperature of the mass is then about 250° F.

The mixed batch of gum is tilted out of the mixer in small portions, cooled, kneaded into loaves of convenient size, and then rolled in machines to hardened sheets of the thickness of the final product. The sheets of gum are next scored, also by machinery, and after further hardening are broken, by hand, if intended for stick gum, into the separate pieces, ready for the auto-

matic packaging machines, which make up the standard five-cent foil package of stick gum. The usual sizes for stick gum are 3 by ¾ by $\frac{1}{16}$ inch, although the product of some manufacturers measures 2⅞ by ¾ by .07 inch. When the gum is to be sold in small squares, the scored sheets are broken apart by tumbling in an octagonal revolving barrel. Chewing gum in the form of balls is made by the use of special machines, which first form small cylinders of gum, then size and roll them to their final shape. The operation of candy-coating small squares and balls of gum is an ordinary operation of confectionery making, performed in a tumbler known as a coating pan.

See CHICLE; GUM.

Cheyenne, shi en′, a tribe of Indians belonging to the same family as the Shawnees, Ojibways and Blackfeet. Originally they lived on the Cheyenne River in South Dakota, but were driven westward by the Sioux. When first known they were agriculturists and lived in settled villages. After they obtained horses they became expert riders. Because of unjust treatment they became bitter enemies of the whites and stubbornly resisted the government. About 1,200 live on reservations in Montana and about 2,000 live in Oklahoma. See INDIANS.

Chicago, Ill., the metropolis of the "Middle West," the second city on the American continent and the fifth city in the world, is situated at the head of Lake Michigan on the western shore, along which it extends for 24 miles. It is 911 miles from New York and 2,274 miles from San Francisco. The location is most advantageous for the development of the great transportation, commercial and industrial enterprises that have caused this city's unprecedented growth. In 1840 Chicago was an insignificant trading post of 4,449 inhabitants. In 1920, its population was 2,701,212. No other city has grown so rapidly.

GENERAL PLAN. Chicago occupies a tract of level land rising only a few feet above the lake. The outline is rectangular, the greater length extending along the lake shore. The greatest breadth is 10½ miles, and the area a little over 200 square miles. The city is regularly laid out. The Chicago River, with its small northwest and southwest branches, divides the city into three areas known respectively as the North Side, the South Side and the West Side. The downtown section of the South Side is the location of the chief banks, retail stores, office buildings, hotels and theatres. The elevated railways encircle the business section, forming the "Loop," the name by which this part of the city is known.

Grant Park extends along the lake front from Randolph Street to Park Row, a distance of about a mile. Bordering this park on the west is Michigan Boulevard, the first street west of the lake, and one of the most beautiful thoroughfares in the world. On the west side of the boulevard are some of the most noted buildings in the city, including the John Crerar Library, the Public Library, the University Club, which is the most perfect example of Gothic architecture in America, the Gas Building, Orchestra Hall, the Railway Exchange, the McCormick Building, the Auditorium Hotel and Theatre, the Congress and the Blackstone hotels. The Art Institute, the only building in Grant Park, is a fine structure in Modern Renaissance. South of Grant Park, at the foot of Twelfth street Boulevard, is the New Field Museum. State Street, the third street west of the lake, is the center of the shopping district.

BUILDINGS OF NOTE. The retail store of Marshall Field & Co., between State and Wabash avenue, covers a whole block. The combined City Hall and County Building is one of the finest structures in America. The Coliseum seats 14,000 people, and is used for conventions and exhibitions. The Federal Building, between Clark and Dearborn streets, occupies the entire block. The Capitol building, formerly Masonic Temple, 21 stories high, is the tallest building in the city. Among recent buildings are the beautiful Wrigley building in Michigan avenue; the Methodist Temple, which with its tower is to have a height of 556 feet, and the Federal Reserve Bank building. The new Union, the Chicago & North-

western and the LaSalle street stations are among the best in America. In addition to the hotels named above is the new Carlton. Among family hotels are the Edgewater Beach and the Chicago Beach hotels. In the the vicinity of Lincoln Park a chain of hotels have been recently constructed, among them, the Parkway, the Webster and the Belden. Others are the Sheridan Plaza and the Fullerton Plaza.

City Transportation. Chicago has over 1,000 miles of street railway and there are four lines of elevated railway connecting the north, south and west sides with the downtown district. All railroads entering the city maintain an adequate suburban service. The distribution of freight to the great department stores and other buildings in the Loop is facilitated by a system of tunnels, 60 miles in extent which connect these buildings with the chief freight depots.

Parks and Boulevards. Chicago has about 200 small parks and playgrounds, 14 large parks and 12 bathing beaches. The area of the park system is about 4,600 acres. Lincoln Park (517 acres) extends along the lake shore, on the north side, for several miles. It is equipped for baseball, tennis, boating and bathing. It has many beautiful statues. The zoological gardens contain about 1,800 specimens of animals, birds and reptiles. The Academy of Natural Sciences is at the main entrance. An aquarium has been constructed at a cost of $175,000. It has 42 separate compartments for native fish only.

Jackson Park (543 acres), extending along the lake shore on the south side, was the site of the World's Fair in 1893. It is equipped with a golf course, ball grounds, tennis courts and bathing beaches. This park is connected with Washington Park (317) acres on the west by the Midway Plaisance, a magnificent boulevard 660 feet wide. A magnificent boulevard connects Washington Park with Marquette Park (323 acres), also on the south side, and with Douglas (182 acres), Garfield (187 acres), and Humboldt (206 acres) parks on the west side. All these parks are provided with recreation grounds, lagoons, flowers, statuary and beautiful walks and drives. Garfield Park has the largest conservatory in America. The small parks and playgrounds are scattered through the city so as to provide breathing space where most needed.

Over 70 miles of boulevards connect the parks of the city and also join beautiful drives leading in all directions into the open country. Bordering Chicago on the west and north is the Cook County Forest Preserve, containing over 15,000 acres of fascinating woodland.

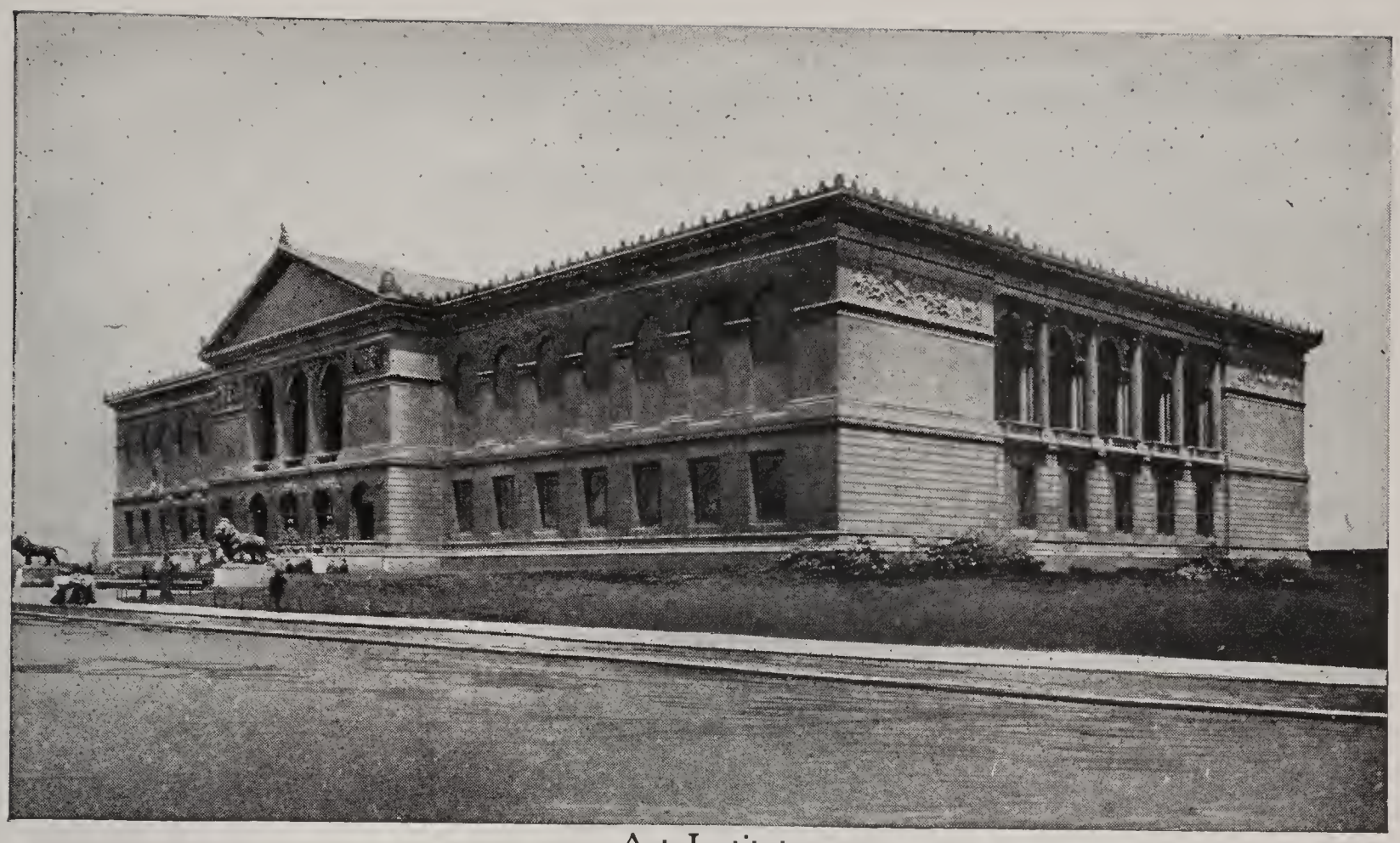
Water Supply and Drainage. The city is supplied with water from Lake Michigan, by means of an extensive system of tunnels, cribs or intakes and pumping stations. The cribs are located from two to four miles from the shore, each is connected with a pumping station by a tunnel under the lake.

In 1900 the Chicago Drainage Canal was completed at a cost of $50,000,000. This canal receives the sewage which formerly flowed into the lake, and conveys it to the Kankakee River at Joliet, from whence it is conveyed to the Mississippi.

A Railway Center. Chicago is the largest railway center in the world. Thirty-nine railways, including twenty-two great railway systems, and forty per cent of the railway mileage of the country terminate in the city. There are over 100 railway yards for receiving, transferring and dispatching shipments. Over 1,340 passenger trains and 192,000 passengers arrive and depart daily from Chicago railway stations.

Water Transportation. Chicago is the largest lake port in the world. It has over 100 miles of water front, more than fifty miles being equipped with dock and railway facilities. Most of the docks are along the river, which has been dredged to a depth that admits the largest lake steamers. In normal years over 6,000 ships enter and clear the port. The Municipal Pier, extending half a mile out into the lake on the north side of the river is used by passenger and freight boats. The pier cost about $5,000,000 and is over half a mile in length. Its eastern end is devoted to recreational purposes.

Industries. Chicago is a convenient meeting place for lumber, iron ore, and



Art Institute

Post Office

CHICAGO

other raw materials and the fuel necessary for their manufacture, consequently it is one of the great manufacturing centers of the country. The manufacturing plants are located chiefly along the river and on the West side. Meat packing is the leading industry and the stockyards, located on Halsted street, from 39th to 43rd streets, are famous the world over. Here are the largest meat-packing houses in the world. Other important industries include the manufacture of foundry and machine shop products, iron and steel, men's clothing, agricultural implements, and printing and publishing.

Chicago is a great commercial center. Its grain and lumber markets lead the world and its wholesale and retail trade are second only to those of New York.

INSTITUTIONS. Chicago has over 1,000 churches, a large number of hospitals and other charitable institutions. The leading hospitals are the Cook County Hospital, the Municipal Contagious Hospital, the Chicago Lying-in Hospital, the Michael Reese, St. Luke's, Wesley, Mercy, Presbyterian, Alexian Brothers and Augustana, The most noted social settlements are Hull House in the Ghetto district, Chicago Commons, Chicago University Settlement and Northwestern University Settlement. The United Charities and Bureau of Hebrew Charities, each maintains a corps of trained workers to aid the suffering and needy.

EDUCATION. The City maintains an adequate system of public schools, ranging from the kindergarten to the Chicago Normal School. Chief among the higher institutions of learning is the University of Chicago, located on the Midway Plaisance, and enrolling over 13,000 students. Northwestern University, at Evanston, has its schools of Commerce, Dentistry, Law and Medicine in Chicago. Among the other institutions worthy of special notice are Armour Institute, Lewis Institute, the Y. M. C. A. College, St. Ignatius College, Loyola University, the Chicago Musical College and the American Conservatory of Music. The Art Institute contains a large collection of paintings, statuary and antiquities, an excellent art library and a lecture hall. It maintains one of the leading art schools of the country, having an enrollment of about 2,500 pupils. The Field Museum contains extensive collections of minerals, natural history specimens, anthropological specimens and antiquities.

LIBRARIES. The Public Library, with over 900,000 volumes, maintains branches and deposit stations in all parts of the city. The Crerar Library, located in its new home on Michigan Boulevard and Randolph Street, and the Newberry Library, located in a beautiful granite building on North Clark Street and Walton Place, are reference libraries. The Library of the University of Chicago, has over 500,000 volumes.

HISTORY. Joilet and Marquette were the first white men to visit the site of Chicago (1673). In 1804, Fort Dearborn was built. John Kinzie was the first white settler. The Indian massacre of 1812 caused the fort to be abandoned temporarily. In 1840, Chicago was a city of 4,449 inhabitants. The Galena & Chicago Union Railroad and the Illinois & Michigan Canal were completed in 1848, and from that time the city's growth was rapid. A fire devastated the business district in 1871, but it was soon rebuilt. The later history of the city is that of its substantial growth in keeping with the development of the surrounding country and the Northwest. In 1893, Chicago entertained visitors from all over the world during the World's Columbian Exposition.

The census of 1920 gives Chicago a population of 2,701,202. The residents represent nearly forty European and Asiatic countries grouped as follows:

Americans (including persons whose parents are not foreign-born)	699,554
Germans	563,708
Irish	240,560
Poles	173,409
Swedes	143,307
Russians	123,238
Bohemians	116,549

These are the large groups, but thirty other nationalities are included in the list.

The Chinese number 1,801, and the Japanese only 257.

Chicago Drainage Canal, officially known as the Chicago Sanitary and Ship Canal, was built in order that the millions

of residents of Chicago might have pure water. In ages past, the waters of the Great Lakes flowed to the ocean through the Illinois and Mississippi rivers. The present valley of the Illinois River is the channel of the mighty stream of other times. This old channel was utilized by the engineers whose task it was to save Lake Michigan from pollution by Chicago sewage. In 1892 was begun the project of connecting the lake with the Desplaines River by canal. In January, 1900, the canal was completed.

The Drainage Canal is twenty-eight miles long; it is 160 feet wide at the bottom and from 162 to 290 feet at water line. The canal varies between thirty and thirty-six feet in depth, the depth of the water never falling below twenty-two feet. At Lockport, Ill., twenty-nine miles inland, are the controlling works. These consist of flood gates and a beartrap dam, by means of which the depth and flow of the water are regulated. The canal was so built that it changed the flow of the Chicago River, making the latter an outlet of Lake Michigan instead of a feeder of the lake, as formerly. The Chicago River now flows away from its mouth, and is the only river in the world in which this phenomenon is to be seen. Because all Chicago sewers emptied into the lake before the construction of the canal, extensive changes in the city's sewer system had to be made while the canal was building.

An extension of the canal from Lockport, Ill., to the Illinois River, now building, will, when completed, afford a through waterway from the Great Lakes to the Gulf of Mexico.

Chicago, University of. One of the foremost educational institutions in the United States is located in Chicago, where it occupies an area of ninety-eight acres along both sides of the Midway Plaisance, a beautiful boulevard joining Jackson and Washington parks. The old University of Chicago, a Baptist school of college grade, was opened in 1857, but it suspended in 1886 for lack of funds. Six years later the present university was opened, largely through the efforts of the American Baptist Educational Society. The growth of the university has been phenomenal. In 1892, it had four buildings; in 1923 there were over twenty-three besides its affiliated schools. The buildings are in Gothic style and are not surpassed by any educational buildings in America.

The university is organized into four departments; (1) schools and colleges; (2) libraries, laboratories and museums; (3) university extension; (4) the university press.

The courses of instruction are arranged on a different plan from that of any other university in the United States. The scholastic year is divided into four quarters of twelve weeks, each being sub-divided into two terms. Under this arrangement a student may drop out for three months and return and take up his work where he left it. The summer term is the busiest of the year, for hundreds of teachers from all parts of the country register for the special courses in education. Graduate work for which the university is especially equipped receives special emphasis. The extension department through lecture study courses and instruction by correspondence, reaches those who cannot do all this work in residence.

The university libraries contain over 700,000 volumes and 200,000 pamphlets. The faculty numbers over 350 and 13,000 students were enrolled in 1922-23, not including those in the correspondence department or the laboratory schools.

In its instruction the university is not denominational and no religious tests are required of teachers or students, but the charter provides that the president and two-thirds of the trustees must be Baptists. The university has received many valuable donations but its greatest benefactor is John D. Rockefeller, whose gifts exceed $35,000,000. The resources of the university exceed $50,000,000, over $30,000,000 of which are in invested funds.

Chickadee, or **Titmouse,** a small bird of the nuthatch family. There are within the boundaries of the United States some seventeen species of titmice, with nearly as many races or subspecies, so that there is no portion of the country that does not have one or more forms. The western

coast region is peculiarly rich in representatives of this family. The chickadee of literature, or the black-capped chickadee, is a trifle over five inches in length. The top or back of the head and the throat are shining black. Other parts are gray or whitish. It ranges from the mountains of North Carolina to the northern timber line of British America, retiring southward on the arrival of winter. It builds a tiny nest of moss and plants down in a hole in an old stump or tree, from the height of one's head up to fifteen feet. There are from five to eight white eggs, speckled at the larger end with cinnamon spots. Speaking of its identification, Chapman says, "When most birds were strangers to me, I remember thinking what a blessing it would be if every one spoke his name as plainly as does this animated bunch of black and white feathers. . . . With winning confidence he introduced himself, and probably for this reason he has always been my best friend among birds."

The examination of 289 stomachs of the chickadee shows that its food consists of 68 per cent of animal matter (insects), and 32 per cent of vegetable matter. The former is made up of small caterpillars, and moths and their eggs. Prominent among the latter are the eggs of the tent-caterpillar moths, both the orchard and forest species. As these are two of our most destructive insects, the good done by the chickadee in devouring their eggs needs no comment. During the winter months, the chickadee's food is made up of larvæ, chrysalids, and eggs of moths, varied by a few seeds, but as spring brings out hordes of flying, crawling, and jumping insects, the bird varies its diet by taking also some of these. Flies and bugs (*Diptera* and *Hemiptera*) are the favorites until the weather becomes quite warm, when beetles and small wasps are also taken. Among the bugs may be mentioned the plant lice and their eggs which are eaten in winter. The beetles nearly all belong to the group of Rhyncophora, or snout beetles, more commonly known as weevils. These insects are mostly of small size, and nearly all of them are known as pests by the farmer or fruit raiser. Seventeen of them were found in one stomach. The plum curculio and the cotton boll weevil may be taken as fair samples. Grasshoppers do not at any time constitute an important element of the food of the chickadee as they are evidently too large for so small a bird; moreover they are for the most part terrestrial insects, while the bird is essentially arboreal. Small wasps and ants are eaten to some extent. Spiders constitute quite an important element of the food and are eaten at all times of the year. The birds evidently find them hibernating in winter as well as active in summer. The vegetable food of the chickadee consists largely of small seeds, except in summer when they are replaced by pulp of wild fruit. The wax from the seeds of poison ivy (*Rhus radicans*) is eaten during the winter months, but the seeds themselves are not taken. In this respect the chickadees differ from most other birds which swallow the seeds whole.—U. S. Department of Agriculture.

Chickamauga, chĭk-a-maw′ga, a creek in northern Georgia and Tennessee. It empties into the Tennessee River near the city of Chattanooga. September 19th and 20th, 1863, it was the scene of a bloody battle. General Bragg, reinforced by Longstreet, fought the three corps of Rosecrans under Thomas, McCook, and Crittenden, and penned him up in Chattanooga. Had it not been for Thomas, "the Rock of Chickamauga," the Union forces would have fared ill. Over 100,000 men were engaged. Fully a third of the number were reported as killed or missing. Some brigades lost over half of their men. The battle-ground, covering an area of eleven square miles, has been ceded to the general government by the states of Georgia and Tennessee for a national park. It was dedicated in 1895, on the anniversary of the battle. A large number of monuments, memorials, and marks have been erected already to commemorate the valor of both sides.

Chickasaw, a branch of Indians allied to the Creeks, Seminoles, and Choctaws. The whites under De Soto found them occupying the headwaters of the Tombigbee and Yazoo rivers, with a trail to the Mississippi River at Memphis, 160 miles away. As the country settled up they sided with the English against the French. They were induced to cede one tract of land after another. The last cession was dated 1834. They were removed to the eastern part of the Indian Territory, where they form the Chickasaw nation, one of the federated Indian tribes of the territory. Even here, over 100,000 whites have crowded in to their territory. As the Chickasaws number less than 6,000 the result is not difficult to foresee, though at present many are farmers and stock-raisers living in a fair degree of comfort. See INDIANS.

Chicken, a common barnyard fowl. All varieties of chickens are thought to have originated from the jungle fowl of south-eastern Asia. There are eighty-seven standard varieties raised in this country. They are divided into several classes, which, for practical purposes, may be reduced to four, as follows:

1. The general purpose, or American chicken. Of these the Plymouth Rock is celebrated for its graceful figure and upright carriage. It is a very handsome bird with fine grey and white plumage. The Wyandottes are also fine birds, not quite so large as the preceding. These two kinds, all qualities considered, are the most desirable where appearance, good habits, abundance of eggs, and dressed poultry are desired. The Plymouth Rock originated in Massachusetts; the Wyandotte in New York.

2. The Brahmas, Cochins, and Langshans, introduced from Asia, are heavy, hardy breeds, considered very desirable for the table. They are somewhat larger than the American chickens, but are not as good layers.

3. The so-called Mediterranean class, including the Leghorns, Minorcas, and Spanish chickens, are abundant layers. The Leghorns are probably the most prolific chickens known. They are light eaters and are active and healthy. Their eggs are smaller than those of American chickens, and they are considered less desirable for the table.

4. Ornamental breeds, Bantams, Japanese, Polish, and Games. The bantam is remarkable for its small size and exceedingly pugnacious disposition. The game-cock, of which there are several varieties, is a tall, gaunt bird, armed with a large spur. It is reared chiefly for cock-fighting. It is still kept for that purpose in some parts of this country. It is a popular source of amusement in Malasia and many other regions. There are two varieties of Games, exhibition and pit.

Incubators are in general use on poultry farms and on many farms that do not make a specialty of raising poultry. The eggs are placed on a tray that holds on hundred or more. Beneath this tray is another in which the chicks stay the first day after hatching. The incubator is heated by a lamp and after the first two days a temperature of 103° should be maintained. The eggs should be turned daily until two days before time to hatch. The incubator should be well ventilated.

Few realize the enormous proportions to which the chicken industry of the world has grown. Speaking for the United States alone, the census of 1920 reported 359,537,000 chickens in the country for that year. Over 1,650,000,000 dozen eggs were produced. If shipped in refrigerator cars, these eggs would fill a train over 900 miles long. The income from poultry exceeds that from cotton, the most valuable field crop, and is more than twice the income received from the sale of swine. Poultry raising is indeed an extensive and important industry.

Chicken Pox, a contagious disease of childhood, accompanied by an eruption of the skin and often by fever. The disease seems to bear some resemblance to a mild form of small-pox, but is considered to be without danger if the patient remains quiet for a few days. A child seldom takes chicken pox a second time.

Chicle, chĭkl, a gum manufactured from the sap of the sapodilla tree. This tree is found throughout tropical America. The chicle industry is confined largely to southern Mexico and Yucatan. Under favorable conditions the tree grows to a height of seventy feet. During May and June camps are established in the sapodilla forests, and preparations are made not unlike those for making maple sugar. The natives make V-shaped cuts in the bark of the tree. A crude milky sap is collected. It is carried in pails to large kettles and boiled down. An average tree will yield about six pounds of the gum, but must not be tapped oftener than once in three years. Well prepared chicle is nearly white when fresh and clean. It is a tough, firm, aromatic, elastic gum. The best quality is worth a dollar a pound in camp. in 1920 the importations of crude chicle into the United States amounted to 9,859,788 pounds. Practically the total supply is utilized by the American chew-

CHICKENS

1. Buff Cochin
2. Black Langshan
3. Barred Plymouth Rock
4. Silver-penciled Wyandotte
5. Belgian
6. English Game
7. French
8. Black Minorca
9. Italian
10. Silver-laced Hamburg
11. White Leghorns
12. Bantams

ing gum industry. The weight of the finished product was 40,000 tons. See CHEWING GUM; GUMS.

Chicopee, Mass., a manufacturing city, is situated on the Connecticut River at the mouth of the Chicopee, 4 miles north of Springfield. The Boston & Albany and Boston & Maine railroads enter. The Chicopee River furnishes power for the city's numerous factories, the chief products of which are artillery, bronze, bicycles, paper, swords, rifles, automobiles and rubber tires. It contains fine public schools, a large library and numerous churches. The population was 36,214 in 1920.

Chicory, a perennial herb belonging to the composite family. It is a native of Europe. The leaves are not unlike those of a dandelion, but the plant sends up a tall, branched, flowering stem. The flowers vary in color, sky-blue predominating. Like the dandelion it has escaped from cultivation and is found along the roadside. It is of value chiefly for a long, carroty root, much used as a substitute for coffee and as an adulterant of ground coffee. For this purpose the roots are washed, sliced, and dried in kilns. Chicory is put on the market, ground and unground. It is raised easily from the seed. From six to ten tons of roots are expected to the acre. American wholesalers import from 2,600,000 to 4,000,000 pounds of chicory root annually. See COFFEE.

Chief Justice, the presiding justice of the supreme court of the United States. The first chief justice was John Jay, who served 1789-1791. His successors were: Oliver Ellsworth, 1796-1800; John Marshall, 1801-1835; Roger Brooke Taney, 1836-1864; Salmon Portland Chase, 1864-1873; Morrison R. Waite, 1874-1888; Melville W. Fuller, 1888-1910; Edward D. White, 1910-1921; William H. Taft, 1921-

Chihuahua, Old Mexico, is the capital of the Mexican state of the same name. It is situated on the Chihuahua River, 225 miles from the United States border at El Paso, Texas, and 999 miles from Mexico City. It was founded as a mining camp in 1703. Situated in a rich agricultural and mineral producing district, and aided by rail transportation over the Mexican Central and Kansas City, the Mexico and Orient, and the Chihuahua and Pacific railroads, this is one of the most important inland cities in Mexico. It is said that in the late eighteenth century, the population reached 70,000. A cathedral over 200 years old stands in a prominent place, and an aqueduct built 200 years ago supplies the city with water. The city was taken twice in March, 1847, by American troops during the war between the United States and Mexico. The industrial life of the city has almost collapsed since the outbreak of the revolutionary wars of the last few years. The population in 1920 was 40,000.

Child Labor, bodily toil of children in gainful occupations. There is a mistaken notion that we are so prosperous in America that children are not called upon to work. The United States Census Bureau issued a bulletin in 1920 in which the total number of American children between the ages of ten and fifteen inclusive was placed at 12,502,582. Of this number, 1,060,858 were engaged in breadwinning. The showing is a little more favorable than that of 1910, but the question of how early and under what circumstances children shall be allowed to work is far from settled.

Investigation and legislation began in Europe. The tendency of employers to overwork children for the sake of profit became apparent to the world during the industrial revolution or shift to the factory system 1760-1830.

The first child labor law of the world was passed by Great Britain in 1802. It passed Parliament in the face of vehement opposition. It forbade children working in cotton and woolen mills *more than* 12 *hours a day.* In 1819 *children under* 9 were forbidden to work in factories, but those 10 years old could work ten hours.

The history of child labor laws is a long one. Child labor is a difficult question to handle. In poverty stricken districts children must earn bread or be given bread, or they must die of starvation. The progress of legislation in the United Kingdom is manifest in the Employment of Children Act of 1903:

1. No child may work before six in the morning or after nine at night.
2. The carrying of heavy weights, and employment in occupations likely to prove injurious to health are prohibited.
3. The age for the prohibition of the employment of children in theatrical performances is raised from seven to ten years.
4. Local authorities (the councils of county boroughs, municipalities of over 10,000 inhabitants, urban districts with over 20,000 inhabitants, elsewhere the county council) are empowered to make by-laws, regulating all occupations of children. Separate regulations for street trading may be enacted.

RECENT MEASURES. On April 25, 1919, a law placing a federal tax on the employment of child labor became effective, and many thought that this event marked the end of child labor in the United States, but they were in error. On May 25, 1922, the United States Supreme Court repealed the law because it was unconstitutional. It placed in the hands of the federal government powers which under the constitution belonged to the states. During the three years of its enforcement this law gave protection to the children employed in factories, mines, and quarries, about 300,000 in all. There were during these years 1,500,000 children between the ages of 10 and 16 years employed in agricultural occupations and in tenements. This law furnished no protection for these children and was to that extent defective.

The repeal of the federal law leaves the problem of child labor where it was in 1918 except that some states have enacted remedial legislation. But, even with this legislation in force, some of the states fall far below the standard of protection adopted by the Child Welfare Conference which met in Washington, D. C., in 1919. Their minimum standard includes the following demands:

1. A minimum age of 16 years for all children employed in labor.
2. A minimum age of 18 years for children employed in mines and quarries and other occupations equally dangerous.
3. Prohibition of employment of children in dangerous and unhealthful occupations.
4. An eight hour day.
5. Prohibition of night work for minors.
6. Compulsory school attendance to the age of 16.
7. Compulsory continuation school attendance to the age of 18.
8. A certificate of physical fitness for all children entering employment.
9. Annual physical examination of all working children under 18 years of age.

Measured by the above standard the federal law fell far short of requirements it should have contained, and it was of but little benefit.

The census of 1920 shows that in that year 1,060,858 children under 15 years of age were engaged in gainful occupations. Of these, 714,248 were boys and 346,610 were girls. A total of 46.7 per cent of the number in 1910, apparently a gain of over 50 per cent, but in 1910 the census was taken in April, when on the farms there was a demand for all labor available, and the census of 1920 was taken in January when agricultural labor was at its lowest ebb. Some allowance must be made for these conditions. Doubtless had the 1920 census been taken in April the percentage of children in employment would have been considerably larger, but allowing for this condition there has evidently been a substantial gain in the prevention of child labor during the past decade.

The census of 1920 also shows that 185,337 children from 10 to 15 years of age are employed in manufacturing and other industrial pursuits, against 647,309 employed in agriculture, forestry, and animal industries. Strange as it may seem, by far the greater number of abuses associated with child labor are connected with the agricultural occupations. In many instances children under the age of employment are compelled to work in beet fields, onion fields, cotton fields and truck gardens. The children's tasks usually consist of weeding or thinning these crops, tasks which require the worker to work upon his knees or in a stooping position for hours at a time. When growing children are subjected to such conditions they are likely to be deformed or to acquire permanent internal injuries. Besides, the long hours tax their vitality to such an extent that growth is greatly retarded or stopped altogether.

Another class of children needing protection includes those working in tenements where work from clothing factories is taken

home. Here long hours in vitiated atmosphere, and now and then insufficient nourishment, cause hundreds of children to become anaemic. Considering these conditions, the leaders of the Child Welfare Association are not wholly despondent over the repeal of the federal law, for they believe that the present conditions give them an opportunity to secure much more effective state legislation in practically all states where it is needed.

Causes of Child Labor. The chief causes of child labor are poverty, or near poverty; greed and the desire of parents to hoard money earned by the children; dissatisfaction with school or desire on the part of the child to earn money and become independent. Statistics show that less than one-fourth of the children in employment leave school because their work is needed to support the family. More than one-half leave school because they are dissatisfied with it, and the remainder leave because they wish to become independent at an early age. These conditions show that child labor is not a problem of employment alone. It is one phase of the child welfare problem and no one should entertain the idea that the proponents of child welfare believe that children should not work. What they are striving for is wholesome and natural conditions for child life, in which the children will have considerable time for play, the minimum education required by the state and an opportunity to work at home amid pleasant surroundings and under careful, loving supervision.

While stringent laws protecting children in employment are necessary and should be enacted in every state where they do not now exist, a campaign of education in the home, and a more careful study of children in school so that courses of study may be more completely adapted to the needs of our time is absolutely essential to bring about ideal conditions of child labor. Those who oppose these remedial measures are placing the money aspect of the problem before the child's welfare, without giving thought to the conditions of future generations. A prominent New England journal places the matter in a strong light.

Statistical figures are cold, uninteresting things, so let's put the matter in another way—

One million underprivileged children, destined to grow to be underprivileged men and women, to recruit the ranks of the half-witted, the gunmen, the incompetent and the criminal.

One million voters less capable of exercising the great function of the ballot because of poor equipment for reasoning power and decision.

One million dwarfed intellects to be the easy prey of prejudice, class consciousness and hatreds. Undersized minds that will fatten the purses of the crafty and the conscienceless.

One million prospects for the I. W. W.'s, the Bolsheviki, and all the other exponents of half-baked theories of government.

One million people whose darkened minds will inevitably pull down the standard of art, music, drama, and life in all its ramifications.

One million children whose pitiable plight shames the boasted wisdom and statesmanship of the United States of America.

One million little folk, at heart innocent of all these and other dire portents for their country, with a real and just grievance against the one hundred million who permit this immeasurable folly of child labor to continue.

An amendment to the Constitution of the United States will be necessary before the Federal government can enact a national child-labor law. Some members of the 67th Congress are willing to sponsor such an amendment, but there are others who oppose further "tinkering" the Constitution, and it is probable that such an amendment will not be submitted to the states by the present Congress.

The National Child Labor Committee has, however, proposed the Twentieth Constitutional Amendment, which reads as follows:

Congress shall have power to regulate or forbid the labor of minors at any age or under conditions deemed injurious to their health or morals. Such power will be concurrent and not exclusive, and the exercise thereof by Congress shall not prevent any State from adopting other or further regulations not inconsistent therewith.

The purpose of the Amendment is perfectly clear, and, at first thought, one would scarcely expect it to encounter opposition. Children are the greatest asset of the country, and their welfare should everywhere receive first consideration. There are

those, however, who do not look favorably upon this addition to the Constitution, and among them are some who are actively engaged in child welfare work.

Opposition arises chiefly from the fact that any law applicable to the entire country can include general requirements only, and such a law would require supplementing by State statutes. Those opposing the amendment object to two authorities engaging in the suppression of child labor. They claim that such a condition would lead to conflict of authorities and confusion on part of parents. But these opponents admit that a Federal law would bring every State into line, and that it would be more rigorously enforced than State laws.

The war's effect in Great Britain and other countries was, naturally, farther reaching than in the United States. In Great Britain juvenile delinquency increased 40 per cent. It was declared that 600,000 children were prematurely withdrawn from school. In Austria the conditions alarmed parliament, while conditions in Italy, France, Germany and other countries were equally bad.

See FACTORY SYSTEM; WAGES.

"For oh," say the children, "we are weary,
And we can not run or leap.
If we cared for any meadows, it were merely
To drop down in them and sleep. . . ."
They look up, with pale and sunken faces,
And their look is dread to see,
For they 'mind you of their angels in high places,
With eyes turned on Deity.
"How long," they say, "how long, O cruel nation,
Will you stand to move the world on a child's heart—
Stifle down with a nailed heel its palpitation,
And tread onward to your throne amid the mart!
Our blood splashes upward, O gold heaper,
And your purple shows your path.
But the child's sob in the silence curses deeper
Than the strong man in his wrath."
—Elizabeth Barrett Browning.

Child, Lydia Maria (1802-1880), an American writer of prose and verse. She was born in Massachusetts and died there. She came into notice through interest in the abolition movement. One of the first anti-slavery books published was her *Appeal for the Class of Americans called Africans.* For several years she and her husband, Mr. Child, edited the *National Anti-Slavery Standard.* She wrote much for children. Among her writings may be mentioned. *The First Settlers of New England, Flowers for Children,* and *Looking Toward Sunset.* One of Mrs. Child's well known poems is *Thanksgiving Day:*

Over the river and through the wood—
Now grandmother's cap I spy.
Hurrah for the fun!
Is the pudding done?
Hurrah for the pumpkin-pie!

Child Study, a phase of scientific investigation taken up chiefly in connection with the training of teachers. Although the early philosophers and teachers commented upon certain traits of the child mind, it was left for the modern educator to do anything really systematic in this field. Rousseau was particularly enthusiastic in his advocacy of the theory that a child should develop in a natural and unhampered way; and this was the inspiration for much of the present development along this line. Froebel, Comenius, and Pestalozzi were especially insistent that anyone who expected to teach the child should study him; while the method of so doing, by observation and experiment, came about in a large measure through the influence of Herbart, who felt that in this field certainly there was no place for introspection and speculation.

The child study movement had its origin in Germany and has there reached its greatest development. Early in the last quarter of the past century attention began to be paid to it in the United States; and within a couple of decades it became an important element in our system of education. Specialists in this field have been developed in the various university departments of education and psychology, and they are employed in other institutions to instruct prospective teachers, or are connected with larger city systems in directing the study of the children by the teacher. State normal schools include the subject in their courses, and the National Educational Association has a special department, for child study. This is also true of most state associations. Thus is seen something of how widespread the movement has become.

In its simplest aspects, child study may

be taken up by any teacher or parent without special training or equipment (though this preparation is desirable). It means simply the observation of the child with a view to discovering how his senses develop, how his physical growth is related to his mental development, what defects he has in sight or hearing, and what are his interests and disposition. This aspect of child study lends itself readily to the home, and every mother, to say nothing of the father, should find pleasure as well as great good in this fascinating study. Much of the lack of understanding between the adult and the young would pass away if but a little effort were made by the parent to know the developing mind. This is particularly valuable at the adolescent period where, without understanding, behavior at this time often seems inexplicable. (See ADOLESCENCE.)

As a result of child study in the preparation of the teacher, the subject matter of education and its order of presentation have become greatly modified. Interest on the part of the pupil is a determining factor both as to the matter and the time when offered. These depend upon each child and must not be arbitrary and dogmatic. The kindergarten and the various phases of manual effort have come in through child study.

Children's Bureau a bureau of the United States government, authorized in 1912, now under the Department of Labor. The work of this branch of the government consists in investigating and reporting upon matters that pertain to the life and welfare of children, such as birth rate, infant mortality, orphanage, desertion, juvenile courts, employment, and legislation concerning children and affecting their interests. Before this bureau was in operation large sums of money had been spent by the United States in getting data on other matters, but nothing special had been done towards getting facts and information about the various questions of child welfare. The first director of this bureau was Miss Julia Lathrop, formerly of Hull House, Chicago.

Chile, chē'la, a republic of South America. It lies between the Pacific Ocean and the Andes Mountains. It extends along the coast from Peru to Cape Horn for 2,629 miles, equal to the distance from Maine to California. Punta Arenas in Chilian waters is the most southerly town in the world. The northern end of the country lies in the belt of eastern winds, and the Andes rob these winds of all moisture. This part of Chile is therefore a dusty, rainless region, scorched by a tropic sun. It is a parched, plantless desert, but it abounds in deposits of nitrates of soda and in mines of iron and precious ores. Busy towns with electric lights and street railways are built up on the nitrate industry. The extreme southern region is rainy, cold, rocky, and barren, the home of a few rookeries of seals, penguins, and sea fowl. Between these extremes of torrid and of antarctic barrenness is a large extent of fertile soil with the productions and prosperity of the temperate zone. This region shades off, of course, into the other two. Wheat and other small grains, grapes, small fruits, and orchard fruits are cultivated in profusion. Cattle raising, mining, and lumbering are the leading industries. The population of the country is about 4,000,000; nearly half of the people live in towns. This includes many of those engaged in mining and fishing. Santiago, the chief city and capital, is situated in the uplands, about 2,000 feet above the sea. It is well built, with public buildings and educational facilities, parks, street railways, and electric lights. Valparaiso, half as large, is the seaport. Together they have a population of half a million, between that of Baltimore and San Francisco.

The prevailing religion of the country is Roman Catholic, with tolerance for all sects. Schools are free, but the common people are still illiterate. The official language is Spanish. The foreign commerce of Chile is extensive and has become important in recent years, Great Britain, getting half the business; Germany nearly a third; and the United States a sixth. The chief exports are nitrate, copper, iodine, wheat, silver, leather, gold, hides and wool. The merchants of Chile buy cloth, paper, oil, chemicals and machinery abroad.

There are 5,403 miles of railway; half belongs to the state. There are 11,000 miles of telegraph lines.

Chile is calling for settlers. The Japanese are encouraged to come over, not only as laborers, but as homesteaders. Already a considerable number of Japanese farmers have given up their diminutive holdings in Japan to make new homes on the rich, unoccupied lands of Chile.

STATISTICS. The following are the latest reliable statistics available:

Land area, square miles	289,829
Forest area, acres	9,495,483
Population (1920)	3,754,723
Santiago	507,296
Valparaiso	182,242
Concepcion	66,074
Iquique	37,421
Talca	36,079
Number of provinces	23
Members of senate	37
Members of chamber of deputies	118
Salary of President	$6,500
National revenue	$135,000,000
Bonded indebtedness	$93,289,000
Farm area, acres	48,183,663
Wheat, bushels	25,000,000
Corn, bushels	1,805,000
Rye, bushels	55,000
Oats, bushels	2,715,000
Barley, bushels	5,385,000
Beans, bushels	1,713,000
Peas, bushels	429,000
Domestic animals:	
Horses	391,718
Mules	51,411
Asses	36,439
Cattle	2,163,141
Sheep	4,500.196
Goats	459,606
Alpacas	42,019
Swine	292,431
Manufacturing establishments	2,871
Operatives	71,464
Output of manufactures	$90,280,252
Coal mined, tons	1,485,491
Output of saltpeter, tons	2,866,000
Copper exported, tons	150,000
Imports	$170.000,000
Exports	$290,000,000
Miles of railway	5,403
Teachers in public schools	7,361
Pupils enrolled	346,386

Chillicothe, Ohio, the county seat of Ross Co., is on the Scioto River, Paint Creek and the Ohio and Erie Canal, 50 miles south of Columbus. The city's history is interesting. Near it are several ancient mounds built by prehistoric men, and also the sites of the villages of the Chillicothe Indians, the latest of which was destroyed in 1787 by the Kentucky Rangers. Chillicothe was settled in 1796, and here Gen. Arthur St. Clair set up his Territorial Government as governor of the Northwest Territory from 1800 to 1803. It was the capital of Ohio from 1803 to 1810, and from 1812 to 1816. The city has many factories, chief among their products being engines, wagons, canned goods, furniture and shoes. Notable features of the city include Adena, the home of Ohio's first governor, a large public library, and the public schools. Population, in 1920, 15,831.

Chillon, shĭl'lon, a castle in Switzerland. It was built 1238 by Amadeus IV of Savoy, and was long used as a state prison. The castle is at the eastern end of Lake Leman. It is situated on a rock almost surrounded by water. Chillon is the scene of Byron's *The Prisoner of Chillon:*

> Lake Leman lies by Chillon's walls:
> A thousand feet in depth below
> Its massy waters meet and flow,
> Thus much the fathom line was sent
> From Chillon's snow-white battlement,
> Which round about the wave enthralls.

See GENEVA, LAKE OF.

Chiltern Hills, a range of flint and chalk hills in England, which extends through Oxford, Hertford and Buckingham shires, the loftiest summit being 905 feet. In ancient times these hills were covered with forests and were infested by bands of robbers. An officer was appointed to protect the people.

Chimborazo, chĭm-bō-rä'zō, a snow-clad peak of Ecuador. It presents a magnificent spectacle from the Pacific, lifting its snowy hood 20,700 feet into midair. It attracted Humboldt's attention in 1802, and he attempted its ascent, but was unfortunate enough to choose the wrong path and was stopped by a chasm 500 feet wide.

Chime, a set of bells, usually five to twelve, tuned in a musical scale. They may be stationary and be struck by hammers played by a performer, or, as is, strictly speaking, the proper way for a chime, they may swing and be struck by a tongue. A bell tower and a chime of bells is a

regular feature of the commercial towns and cities of the Netherlands. There are many fine chimes in France and in England. There is no sweeter sound than the music of a chime of bells floating across the country side. See BELL.

Chimaera, kĭ-mē′ra. See BELLEROPHON.

Chimney, an upright passage designed to carry away smoke and create a draft. It may be built of any non-combustible material, as brick, stone, or concrete. The design of the fireplace chimneys of the early settlers was brought from England. In wooded countries, they were built of short wooden logs, well plastered within with clay. Chimneys of stone masonry were a great improvement. The higher a chimney, the better the draft, as this depends on a difference in weight between the warm air of the chimney and the cold air on the outside.

Chimney Swallow. See SWIFT.

Chimpanzee, a manlike ape of equatorial Africa. Its arms are long; the hind toe acts like a thumb. It is smaller and more active than a gorilla. It usually walks on all fours with its fingers doubled under the palm of the hand, but by grasping its thighs with its hands, also walks erect, the most nearly so of all apes. The skin is yellow and is clothed with shining black hair which hangs at a considerable length about the head and shoulders. The chimpanzee is fitted for climbing. Its natural food consists of fruit and birds' eggs. The female brings forth its young on a rude platform of sticks put together in a lofty tree-top and abandoned as soon as the young is able to accompany its parent. The chimpanzee feeds chiefly at night, and is dreaded by planters, whose banana plantations are likely to be ruined by the nocturnal visits of these destructive animals. It is the most human of all apes. It can be taught in captivity to eat with a knife and fork and to perform many tricks requiring not only powers of imitation, but intelligence and judgment. See GORILLA; ORANG-UTAN; MONKEY.

China, Republic of is a vast country of western Asia, composed of China proper, which includes 18 provinces, Sinkiang, or the New Dominion, the dependencies of Manchuria, Fengtien, Kirin and Heilungkiang, and Mobgolia and Tibet. It is estimated that the area of the Chinese Republic is over 400,000 square miles. The population in 1920 was 440,934,000.

TOPOGRAPHY. China proper is a compact and fertile country. It has 2,500 miles of seacoast, with numerous good harbors. The best way to carry the geography of China in mind is to regard it as a series of parallel valleys or river plains, running to the Pacific Ocean. The interior of the country about the head waters of these rivers is hilly or mountainous, and is practically unknown to travelers. The lower valleys are broad, alluvial plains, like those of the Mississippi, and are exceedingly fertile. The great cities are situated on these rivers or on harbors near their mouths. At a distance of 100 miles from the coast, the Hoang-Ho and the Yang-tse-Kiang are connected by the Grand Canal, 1,000 miles in length—the greatest canal system in the world. The soil of China is, for the most part, a rich red or yellow clay. In the north central part there are vast areas covered to a great depth with a peculiar, fertile soil called loess. It is believed to have been formed by a gradual accumulation of dust, carried by winds from the elevated table lands of central Asia. The Chinese are exceedingly industrious. When a hillside is too steep for cultivation, they form a series of broad steps or terraces, so that no part of the country may be useless.

MINERALS. China is rich in minerals, especially in coal. The most extensive coalbed known lies in the great bend of the Hoang-Ho. Gold, silver, and copper are found in limited quantities. There is an abundance of mercury and iron. Little is known of the lead, tin, and zinc which are believed to exist. Inexhaustible beds of kaolin, or porcelain earth, have given the country its reputation for chinaware.

FLORA AND FAUNA. The country is so large that it is difficult to characterize the plants and animals in a general description. There are said to be over 700 different birds and about 200 mammals. Tigers and leopards are still found on the

Manchurian border. The bear, the lynx, the badger, the marten, and the weasel, as well as the elephant, rhinoceros, and the tapir, are still found in certain localities. Chinese pheasants have been imported into this country. The native home of the peacock is here. Eagles, hawks, and owls are found. The rivers teem with wild ducks and geese, swans and pelicans. The handsome mandarin duck is a native of China. The cormorant has been trained by the natives to capture fish. A ring is put around its neck so that it cannot swallow. It dives from the prow of the keeper's boat, pursues the fish with incredible rapidity, and brings them up in the pouch under its lower mandible. The catch of fish in the rivers and canals is large. The fish spawn in the rice fields when flooded. Our goldfish are from China. A mere list of trees and shrubs native to the country would occupy pages. A large number of our ornamental shrubs and varieties of fruit-bearing trees are from China. Of shrubs having special value, the most notable are the tea plant and the mulberry tree, on the leaves of which the silkworm feeds. The pine, yew, and cypress, various oaks and the chestnut, and several palms are found in different parts of the empire. The plant most used for building purposes, however, is the bamboo, to the article on which the reader is referred. The Chinese are famous fruit raisers, gardeners, florists. Some of our garden plants were developed first in China. Of fruits, the orange, peach, pomegranate, quince, plum, and apricot flourish. The camphor tree is a native. We are indebted to China for many varieties of azaleas, camelias, hydrangeas, asters, lilies, and roses.

AGRICULTURE. Agriculture is the leading industry. Rice is the principal crop. It is of two kinds—an upland rice, cultivated after the manner of wheat, and a lowland rice, requiring irrigation. Two crops of the latter are raised yearly in the river plains of the south. The Chinese are exceedingly industrious and utilize every inch of land, going to the extent of setting out rice plants by hand. Their implements, however, are rude, and they object strenuously to any change either in methods or tools. The sickle, the threshing floor, and the winnow are still in use. Sugar-cane, indigo, the castor oil plant, wheat, barley, peas, beans, all sorts of vegetables, Indian corn, buckwheat, and tobacco are raised in suitable districts. Chinese cotton is of immense importance to the inhabitants, but is of rather inferior quality. Chinese silk, on the contrary, has greater firmness and strength, as well as a more beautiful luster than that of any other country.

The great curse of China has been opium, and the poison affected not only the lowest, but the highest classes of society. Ever since the unrighteous Opium War, the growing of poppies had been increasing, but at the close of the Russo-Japanese War the government realized that the opium habit must be checked or China would be helpless to protect herself. In 1906 the government issued stringent regulations so that by the reduction of poppy growing at the rate of one-tenth a year, the use of opium should cease altogether in ten years. In 1907 they made an agreement with the British government whereby Great Britain agreed to reduce her importation from India into China at the same rate. From the time of the decree no one was allowed to begin the use of the drug; all opium users, opium dens, shops, and the amount of their sales, were listed. All government officials, teachers and sailors were ordered to give up the drug, and those who disobeyed were banished. These stringent measures are having a pronounced effect, and already missionaries and others report whole districts formerly given over to the poppy now being under cultivation of rice and other cereals, while the effect upon the people themselves is even more marked.

INDUSTRIES. At some time in their history the Chinese must have been inventive. They are credited with gunpowder, the mariner's compass, printing from wooden blocks, looms, waterworks of bamboo cane, the construction of canals, artesian wells, as well as many other enterprises requiring inventive ability. At the present time, however, the Chinese workman is not intelligent. It appears to be a part of the national religion to do as has been done

1. Woman's shoe for normal foot. CHINESE ART. 2. Shoe for bound foot.
3 & 4. Opium pipes. 5. Head-dress of empress.
6 & 7. Heads of pikes. 8. Battle ax. 9. Two sabres in one scabbard. 10. Swordstick.
11 & 12. Ornaments. 13. Girdle clasp of wife of mandarin. 14. Porcelain vase. 15. Fan.
16. Tea service. 17. Black lacquered vase inlaid with mother-of-pearl. 18. Old tea-canister, carved soapstone panels. 19. Written characters, new style. 20. Tin-tso coral ornament from the hat of a mandarin's wife. 21. Ornamental pin. 22. Ear pendant of glass and coral, with tassel of silk. 23. Carved bamboo sup. 24. Pendant of necklace. 25. Pin, gold and enamel. 26. Gold ornamental pin. 27. Engraved wooden comb. 28. Ladies' handbag. 29. Embroidery. 30. Textile fabric.

No matter how laborious or clumsy a method may be, it never occurs to the Chinese workman or laborer that there might be an easier or a quicker way. Instead of gaining credit, workmen who were to propose a better method would be attacked as irreligious.

Language. In race and speech the Chinese are related to the inhabitants of Tibet, Mongolia, Manchuria, and Japan. They are supposed to have entered the country from central or western Asia. A few remnants of a preceding people still persist in certain mountainous districts, just as the Celts have persisted in the Highlands, in Wales, Cornwall, and Brittany. The Chinese language consists of words of but one syllable. Words seemingly of more than one syllable, as Pekin and Canton, are compound or agglutinated words like our stovepipe, sheepfold, and the like. In writing, a separate character is used for each of these monosyllabic words. The character has the same meaning in all parts of China and in Japan. It may, however, be pronounced differently, just as our figure 4 has the same meaning in all parts of the civilized world, but goes by many different names. It is necessary for a Chinese boy to learn the meanings of about 50,000 characters. They are arranged in vertical columns instead of in lines running crosswise of the page and are read up instead of down. Chinese writings are perhaps the most ancient in existence. If we except the Scriptures of the Hebrews, Chinese literature may be considered the most extensive and important produced in Asia. All officeholders must be highly educated.

Religion. The prevailing religion of the people is Taoism, a sort of ancestor worship. Many profess a form of Buddhism. The state religion is a system of ethics taught by Confucius, who lived about 550 B. C. Reverence for things as they are, obedience to parents, and ancestor worship are carried to an extreme. More attention is bestowed on the dead than on the living. The family graves are protected with so much veneration and take up so much space as to interfere seriously with the agricultural productivity of the country. One of the chief difficulties to be experienced in the building of railways is the frenzied opposition of the inhabitants to the excavating of railway cuts that disturb their private burial grounds, which it is impossible for the most skillful engineer to avoid. In 1905, aside from Russian lines, China had but one mile of railway for each million of people.

Habits and Customs. Owing, possibly, to the prevalence of earthquake shocks, dwelling houses are of one story. They are without windows. The material varies greatly in different parts of the country. It may be brick, straw, thatch, bamboo, or woodwork filled in with plaster. Adobe huts predominate. There are 4,000 walled towns. The houses of the wealthy consist of numerous chambers constructed frequently around an inside open court. In these houses, the floors are covered with matting and are kept scrupulously clean. Rich and well-to-do women dress attractively. To distinguish them from the peasantry, who walk and work, the feet of ladies were formerly bandaged from infancy, so as to prevent their growing. They hobbled about in delicate little high heeled slippers about large enough for a child three years old. With the awakening of China, however, this practice has been abandoned. Likewise by imperial edict in 1910 all Chinamen who desired to, were permitted to cut off their queues.

History. The connected history of China really dates from the conquest by the Manchus in 1644. They have furnished the most intellectual line of rulers that China has had, and in the early period of China's relations with the western world they were favorably disposed toward the European traders. In the reign of Emperor Tao-Kwang (1821-51), they began to realize that they were exporting their choicest products, silks, tea, silver, etc., and receiving nothing in return but the harmful opium. The emperor accordingly tried to suppress the nefarious trade, but only succeeded in precipitating the Opium War (1840-42), with England, whereby the ports of Canton, Shanghai, Ning-po, Tu-Chow and Amoy were thrown open, and Hong Kong was ceded to Great

Britain. This increase of rights to foreigners led to subsequent uprisings and revolts which threatened to destroy the empire itself had it not been for the assistance rendered by "Chinese" Gordon. The next decades marked attempted encroachments by France, Russia, and Japan. Finally in 1894 China and Japan became involved in a war over Korea, in which China was defeated, and by the Treaty of Chefoo, 1895, she was obliged to cede Formosa and certain parts of the Liao-tung peninsula to Japan. New treaty ports were also opened to the world trade. China now set to work to reorganize her army, but the other nations were clamoring for territory, which they received. Russia obtained a twenty-five year lease of Port Arthur and adjoining territory; England, to counterbalance this, secured the port of Wei-hai-wei across the straits from Port Arthur. France secured a long lease of the coast of the Bay of Kwang-chan-wan. These various concessions aroused the anti-foreign element in China and led to the Boxer uprising of 1900. The armies of the United States, France, Great Britain, Russia and Japan, marched upon Pekin to protect their legations. With the restoration of peace, all the foreign troops were withdrawn save those of Russia which remained in Manchuria for the alleged purpose of guarding the railway, until forced out by the Russo-Japanese War. In 1906, the government took measures to abolish the opium trade, and in 1907, the first definite steps were taken toward establishing a constitutional monarchy. The Emperor Kwang-Hsu died in 1908, and his death was immediately followed by that of the dowager empress. The last emperor was Pu-Yi, born in 1906, the government being under the regency of his father, Prince Chun.

GOVERNMENT. Down to 1906, China was an example of the most complete absolutism. In 1907 steps were taken leading toward parliamentary government, and in 1908 an imperial decree authorized the establishment of provincial assemblies, for which elections were held the following year. Meanwhile, a plan for a national assembly had been approved which, however, had advisory powers only.

The Chinese uprising against the Manchu government began in the latter part of 1911. The rebels captured many cities, and province after province seceded until, by the close of the year, fourteen out of twenty-two had thrown off their allegiance, though the dynasty sought to preserve itself by granting every demand of the people. A new constitution was sanctioned by edict November 3, and on November 6 the regent abdicated. On December 14 the Nanking assembly, representing 14 provinces, elected Dr. Sun Yat Sen president of the Republic of China. On February 15, 1912, the emperor abdicated the throne, and on the same day Dr. Sun Yat Sen resigned, and Yuan Shih Kai was elected president and was inaugurated at Peking, March 10. A cabinet was speedily formed with Tang Shao Yi as Premier. The Legislature consists of an upper house of 274 members elected by the provincial assemblies and a lower house of 596 elected by a restricted manhood suffrage. The Republic has adopted a new flag on which the old dragon has been replaced by five stripes—crimson, yellow, white, blue, and black—to represent the five classes of people—Mongol, Chinese, Manchu, Mohammedan, and Tibetan.

Civil war, covert or overt, has disturbed China ever since the establishment of the Republic. In 1915, Yuan Shih-kai openly proclaimed himself emperor. In June, 1916, the would-be emperor died, and Li Yuan-hung, the Vice-President, became President. Upon his election, the revolted southwestern provinces disarmed, and China was again united.

After China had officially declined the allies' invitation to join them against Germany in the World War, the Chinese Minister of War declared war on his own responsibility, after dismissing the parliament. Parliament moved to Canton and resumed its sessions. The southwestern provinces again armed against the Peking government, and Dr. Sun was elected President, the legal President having died. The Sun government, however, was not recognized by the nations, and has since fallen. President Hsu Shih-chang, elected at Peking in 1918, was the officially recognized

head of the Republic in 1923, but he was compelled to retire at the command of Wu Pei-fu.

STATISTICS. The following are the latest reliable statistics available:

Land area, square miles	3,913,560
Population (1920)	440,934,000
Foreigners	326,069
Chief cities:	
Shanghai	1,538,500
Foochow	1,491,413
Canton	1,367,000
Peking	1,300,000
Tientsin	800,000
Hangchow	684,137
Nanking	376,391
Number of provinces	22
Members of senate	264
Members of house of representatives	596
National revenue	$490,420,000
Cotton, bales (500 lbs.)	1,000,000
Tea, pounds	173,685,498
Tobacco, pounds	400,000,000
Raw silk, pounds	13,669,000
Iron ore, tons	1,500,000
Coal, tons	23,000,000
Wool, pounds exported	56,705,000
Copper, tons	10,963
Tin, tons	10,000
Silver, ounces	107,155
Lead, tons	13,527
Antimony, tons	28,316
Imports	$1,290,000,000
Exports	$915,000,000
Miles of railway	7,500
Number of schools	134,000
Pupils enrolled	5,500,000

China Sea, or as it is sometimes called, the South Sea, is the largest of the enclosed or partially enclosed seas lying along the east coast of Asia. These seas are formed by the long chain of islands lying in the Pacific Ocean and extending from Kamchatka to the end of the Malay Peninsula. The China Sea is bounded by China and Formosa on the north, where it connects with the Eastern Sea by the Strait of Formosa; by French Indo-China, Siam and the Malay Peninsula on the west, and by the long island girdle of Borneo and the Philippines on the south and east. From south to north, the sea varies in depth from 1,000 to 13,000 feet. This sea is the sailor's dread at the season when the typhoons sweep it. On the China Sea or near to it are the ports of Canton, Saigon, Hong-Kong, Bangkok, Singapore and Manila. The largest rivers emptying into the China Sea are the Menam, the Mekong, and the Si-Kiang.

China Silk, a plain-woven silk manufactured on the hand looms of China, Japan, and India. The same thread is used for both warp and weft, the weaving is done evenly, and the finished product possesses a natural luster. As the spinning is done by hand also, there are imperfections in the thread which produce certain irregularities in the fabric. These irregularities

Chinch-Bug, an insect noted for its destructive effects in grain fields. The adults are blackish with white wing covers. Six of these bugs placed end to end would scarcely measure an inch. They spend the winter under cornstalks, straw, or any other rubbish, and lay their first eggs in early spring in grain fields on the roots or lower part of the stalks. The young are hatched in about twelve days. The nymphs, as they are called, are red in color. They are like the parent, save that they are very small and are without wings. They feed on the roots of the grain for a time; then attack the stalks and blades. In about two months from the laying of the egg the entire generation, numbering millions in a badly infested field, have their growth, and start on the march for new pastures where they at once lay eggs for a second brood. Sometimes their advance may be stayed by a ditch into which they tumble; if holes be dug at ten foot intervals in the bottom of the ditch the bugs will collect in them and be destroyed. Their only natural check seems to be a contagious disease which carries them off in multitudes. The various agricultural experiment stations are making an effort to check this pest by introducing diseased bugs in localities where the chinch-bug is in vigorous condition.

Chinchilla, a small rodent reminding one of the field mouse, the chipmunk, and the coney. It is about ten inches in length, with half as much to be added for its tail. It lives in colonies in the Andean region. It is clothed with beautiful, pearly gray fur, which is much in demand for fur garments, trimmings, etc.

Chinchona. See CINCHONA.

Chinese Exclusion. Not long after the discovery of gold in California, 1848, Chinese laborers, whose standard of living was very low and who, therefore, willingly worked for low wages, began to come into the United States. About thirty years later the influx of Chinese into the western states assumed such proportions as to seem a menace to the standards of American workingmen, and an appeal was made to Congress for legislation that would suspend, or at least restrict, Chinese immigration. A treaty with China giving the United States the right to suspend or restrict was ratified in 1880. In 1882, therefore, an act excluding Chinese for ten years and prohibiting their naturalization was passed. The act was renewed in 1892, and amended so as to compel the Chinese residents of the United States to procure certificates of residence. The amendment was necessitated by the fact that smuggling in of Chinese had become so extensive on the Pacific Coast as to amount almost to an industry. In 1902 the law was renewed and made still more comprehensive. The Chinese in the United States numbered 61,686 in 1920.

Chinese Gordon. See GORDON, CHARLES GEORGE.

Chinese Literature. See LITERATURE.

Chinese Wall. See GREAT WALL OF CHINA.

Chinook, the name of an Indian tribe which formerly lived near the mouth of the Columbia River. The term has been transferred to a warm, southwest wind which blew from the Chinook country to the region occupied by the Hudson Bay Fur Company at Astoria, Oregon. In Washington and Oregon a chinook is a southwest coast wind laden with the warmth and moisture of the Pacific Ocean. East of the Cascades and east of the Rocky Mountains a chinook is a warm, dry, westerly or northerly wind, coming down the east slopes of the mountains. It is dry because it has precipitated its moisture on the mountain tops, and it is warm because the air is crowded together, or condensed, in descending the mountain slopes. The warmth is due to the operation of a physical law, that compression, or shrinkage of bulk, warms any substance. A chinook is likely to set in at any hour of the day, and to continue from a few hours to several days. A continued chinook flows out several hundred miles from the mountain range. The chinooks modify the winters of eastern Oregon and Washington and of Montana, Idaho, and Wyoming, the western parts of the Dakotas, and the northwestern provinces of British America. Occasionally a chinook, known as a winter thaw, reaches the Mississippi Valley, and something of the sort is noticeable on the eastern slopes of the Alleghenies. Similar winds are known in Switzerland. The chinooks are of great value to stockmen, who depend on standing grass for their cattle during the winter. Oftentimes a heavy fall of snow, followed by cold weather, renders it impossible for the cattle to get at the dried grass. When a warm, dry wind comes speeding down from the distant mountains, the snow and ice disappear in a marvelously short time, and the cattle are out on the plains and hillsides, feeding abundantly, all danger of starvation happily averted.

Near the mountains a chinook may be a heavy gale, but farther out on the plains, it subsides into gentle, light, delightfully warm puffs. The cattle seem to anticipate the coming of a chinook, for when cold and hungry, they stand looking towards the mountains, awaiting relief.

Chinquapin, chĭn′kà-pĭn, an Indian name for the dwarf chestnut of the United States. This shrub ranges from Pennsylvania to Texas. The name is applied also to a shrub oak of the Sierra Nevada Mountains.

Chintz, chĭnts, the name under which printed cottons were imported originally from India. The word is from the Hindustanic *chhint,* meaning spotted. The hand-woven, hand-printed chintz made in India is a coarse fabric of uneven threads. It is printed in old-fashioned designs and is finished without starch or dressing. The name is used at the present time among manufacturers for a species of glazed calico used for furniture covering and draperies.

Chipmunk, a small striped American squirrel, half way between the true, or tree squirrel, and the gopher, or ground squirrel. Its Latin name signifies a steward, and is expressive of its characteristic habit of storing away hoards of nuts, grains, and seeds, for use in time of scarcity. The chipmunk frisks in and out about stone walls, log piles, and stumps. It excavates long burrows beneath the frost line. Convenient chambers, or enlargements, are arranged at intervals in which it stores its supplies. A living room is furnished with a comfortable bed of leaves. Like its relatives, it has capacious cheek pouches in which it carries nuts, seeds, buds, and grain to its storerooms. The storage instinct seems to have no limit. If a grainfield, or bin of grain, or a corn crib be at hand, it is said that a pair of chipmunks will secrete a bushel of food, carrying, in fact, until the season drives them under ground to sleep until spring comes. His store of food is intended, it would seem, for springtime scarcity. The body of the Eastern species is about six inches long, with a slender tail nearly as long as the body. Its back carries five black stripes and two white ones. The Rocky Mountain species has the same number of dark stripes and four white ones.

The chipmunk, on the shingly shagbark's bough,
Now saws, now lists with downward eye and ear,
Then drops his nut, and, cheeping, with a bound,
Whisks to his winding fastness underground.
—Lowell, *An Indian Summer Reverie.*

Chippewas, a tribe of American Indians allied to the Delawares, Shawnees, and Blackfeet. They occupied a large territory surrounding Lake Superior. Numerous small bands are still found in this region. Nominally they live on reservations, but they are to be seen paddling up and down the rivers and lakes almost anywhere. They are preëminently children of the forest. They are skillful in the construction and use of birch bark canoes, and are great hunters, trappers, and fishers. Enmity existed between them and the Sioux for generations. The border line between the two tribes in Minnesota, as elsewhere, appears to have been the edge of the evergreen belt. Each made murderous forays into the territory of the other. The traveler by rail in the wooded region of Wisconsin and Minnesota not infrequently catches a glimpse of an Indian lodge on the shore of a river or lake. A canoe is likely to be moored near by. Old clothes hang on the bushes. Dogs and papooses are in evidence. If the lodge be low and rounded, it is that of a Chippewa; if conical and pointed, it is that of a Sioux. Longfellow's *Hiawatha* is the hero of the Chippewa or Ojibway nation. Chippewa is a favorite geographical name in the upper peninsula of Michigan, in Wisconsin, and in Minnesota. See INDIAN.

Chiron, kī′rŏn, in Greek mythology, a learned centaur. The Greeks were fond of horses. Other mythological monsters were wholly devoid of good traits, but the centaur, half horse and half man, while savage at times, is represented often as wise and, to a greater or less extent, the friend of man. Chiron was instructed by Apollo and Diana, and became skilled, especially in medicine, music, hunting, and the art of prophecy. Many renowned Grecian heroes were his pupils. He instructed Achilles, Hercules, Ulysses, Aeneas, and others. While chasing the boar Erymantheus, the capture of which was one of the twelve labors assigned him by Eurystheus, Hercules had a fight with the centaurs, drove them from Mount Pelion, and pursued them into the abode of Chiron. Here an arrow from his bow accidentally wounded his old teacher, and Chiron suffered tortures from its poison. In pity the gods put an end to his mortal life, but he was placed among the stars as the constellation Sagittarius or The Archer. See HERCULES.

Chiropractic, ki′ro-prak′tic, a method of adjusting the cause of disease by the adjustment of vertebrae. The method is founded upon the hypothesis that the subluxation of the vertebrae causes pressure upon the nerves that pass through the openings between the vertebrae as they leave the spinal cord and that this pressure prevents the cord and nerves from performing their normal function of transmitting mental

impulses from the brain to the body. Subluxations are caused by jars, twists, and other strains of the body which occur during the performing of ordinary occupations. Many of them are so slight that the patient does not realize their existence and is unable to determine the cause of his ailments.

The adjustment consists of such re-positioning of the vertebrae as will place them in their normal positions. The movements and motions necessary to accomplish this are peculiar to this system and unless one is thoroughly trained in the method it would not be beneficial to the patient. Chiropractors claim that through adjustment the cause of all disease can be corrected. The least displacement of the vertebrae changes the form and often the size of the openings through which the spinal nerves pass and any such change brings an unnatural pressure to bear upon the nerve. If on the motor side, the controlling function of transmission through the nerve is restricted or entirely inhibited so that the organs to which this nerve passes are deprived of action to a greater or less degree. When the nerve is restored to its normal condition, the resumption of these functions naturally follows.

Chiropractic was introduced into the United States in 1895 by Dr. D. D. Palmer, but at this time it was neither an art nor a science. It grew very slowly until 1903, when Dr. Palmer's son, B. J. Palmer, developed it into a well defined scientific method of adjusting the cause of disease. Since its value has become known, the method has found many advocates. In 1922 there were about 19,000 chiropractic practitioners in the United States and over 3,000 students in the chiropractic schools. The leading school is at Davenport, Iowa, under the immediate supervision of Dr. B. J. Palmer. The course of study for a chiropractor is equivalent to the four years' course in a standard medical college, including some subjects pursued in the ordinary medical schools in addition to those necessary for special preparation for this method. (Edited by B. J. PALMER.)

Chitral, a small mountain state of British India in the upper basin of the Kashkar, a tributary of the Kabul River, and bordering on Kashmir and Kafiristan. It is 5,200 feet above sea level. For the greater part the people are Mohammedans, but speak the language of their pagan neighbors in Kafiristan. Upper Chitral is closely connected with Gilgit.

The natives, Chitrals, belong to the Kafirs, and therefore physically to the white race, and in language to the Aryan stock. Their number is between 150,000 and 200,000. Towards the end of the 19th century they came into conflict with the English, and Chitral is now included within the British sphere of influence, politically, but it is said that the British exercise the minimum of interference. Chitral alone, of the adjacent states, can be said to have anything like an organized government.

Chittenden, Russel Henry (1856-), an American physiological chemist, was born in New Haven, Conn., and graduated at the Sheffield Scientific School and Yale, later studying at Heidelberg. He became professor of physiological chemistry at Yale in 1882, and director of the Sheffield Scientific School in 1898. He was lecturer on physiological chemistry at Columbia University, New York, from 1898 to 1903. He was president of the American Physiological Society from 1895 to 1904, and in 1907 became president of the Society of Biological Chemistry.

Dr. Chittenden has made many important researches in physiological chemistry, especially dealing with questions pertaining to the chemistry of proteids and their primary cleavage products; he has also made valuable contributions to subjects relating to the processes of nutrition. He is the author of an important work on *Digestive Proteolysis*.

Chivalry, shĭv'al-ry, a medieval system of military service. The term is akin to chevalier and cavalry, meaning fundamentally a horseman. Chivalry consisted essentially of the order of knighthood to which ordinarily no one could gain admission unless of good blood and fit character and training. He must then be admitted by a knight in regular standing. Customarily a boy of good family was sent

to live in the family of some nobleman at the age of twelve. At first he was a page, and was required to wait on the ladies; then he became a squire and waited on a knight. He practiced in the tilt yard, learning the use of armor and the sword, the management of a horse, and the handling of a lance. It was his duty as a squire to follow his knight to battle, carrying his shield. At the proper age, especially if distinguished by some act in battle, he was knighted, or admitted to the order. This was a religious ceremony, including fasting, receiving the sacrament, and taking upon himself solemn vows to honor and defend women, to protect orphans, to tell the truth, to refrain from slander, and to be loyal to his king and to the church. At the close of the ceremony, he knelt a squire, received a blow on the side of the neck or on the shoulder from the flat of a sword, and rose a knight. Not infrequently, a king might confer the honor of knighthood on the field of battle as a reward for bravery.

Sir Walter Scott was a great admirer of chivalry. His hall at Abbotsford was hung with armor and mementos of this age. His tales are full of descriptions of knightly encounters and of the customs of chivalry. Although he paints in bright colors, his writings may be regarded as a trustworthy reflection of the best side of chivalry.

Spenser's *Faerie Queene* dwells upon the same tales of knightly adventure and courtesy. The knight's armor rendered him a power for good or evil among common men. If he lived up to his vows he was a helper of the needy, a friend of the oppressed. Too often, however, knighthood served as a protection in the commission of the vilest acts. Says the historian Freeman,—"Chivalry was above all else a class spirit."

See ARMOR; CERVANTES; SPENSER; FEUDALISM; CASTLE.

Chloral, a compound of chlorine with oxygen, hydrogen, and carbon. The chloral of the druggist and physician is a compound of choral and water, and is termed hydrate of choral by the chemist. In this form it is a white, crystalline substance having an acrid taste and a pungent odor. In medicine, a dose of from five to twenty grains is sometimes given to produce sleep. It is thought that choral, introduced into the system, is acted upon by the alkali of the blood in such a manner as to liberate chloroform, which acts directly on the nerves of the brain. An overdose of chloral overdoes the quieting process and paralyzes the brain, the heart, and the lungs, and brings on death. Chloral is a standard remedy for insomnia, but it should on no account be taken, except under the advice of a competent physician.

Chlorine, klō′rĭn, an elementary substance. It never occurs free, but always in combination with other substances, very often with sodium. It is a poisonous, greenish gas about thirty-five and one-half times as heavy as hydrogen and two and one-half times as heavy as air. It has an offensive odor and irritates the nostrils when breathed. It may be liquefied by cold and pressure. Chlorine has a strong affinity for hydrogen, and, for that reason, is much employed in bleaching cotton and linen. It decomposes moisture by uniting with the hydrogen, leaving the oxygen free to neutralize the coloring material. This gas is destructive to animal and vegetable life because it absorbs the hydrogen of the water living things contain. Chlorine unites with metals and other substances to form a large class of compounds known as chlorides. Chloride of lime makes an excellent deodorizer or disinfectant, as it not only neutralizes offensive smells but kills bacterial germs. Chlorine enters into the composition of common salt from which it may be obtained. See BLEACHING.

Chloroform, a heavy, transparent, colorless liquid composed of carbon, hydrogen, and chlorine. It is prepared by distilling a mixture of water, alcohol, and bleaching powder, or chloride of lime. Chloroform must be kept in the dark or it will decompose; it must be corked tightly or it will evaporate. It is used in the arts to dissolve rubber, resins, and fats. In medicine, it is administered in minute quantities. Its effects are akin to those of alcohol, but are more energetic.

In surgery, chloroform is used to produce unconsciousness during a painful operation. It was first used for this purpose by a Dr. Simpson of Edinburgh, 1848. It is administered by presenting a saturated sponge to the patient's nose. The vapor spreads through the lungs and blood to all parts of the body. In a few moments the patient passes through all stages of alcoholic excitement into a helpless, we may say drunken, sleep, during which he is unconscious of pain. The most painful operations may be performed without his knowledge—operations that otherwise could not be performed. Chloroform is an essential part of the army surgeon's outfit, and does much to save the lives of men wounded in battle. It should be administered only by an assistant of experience, as an overdose produces death. With proper precautions, however, its use is not dangerous. Only one person out of three or four thousand fails to come out from under the influence of chloroform. Ether is preferred by many surgeons.

Keepers of dangerous wild animals, as lions or tigers, put them under the influence of chloroform when it is necessary to handle them, to dress wounds, or to transfer them from one cage to another. It may be administered by fastening a saturated sponge to the end of a pole and pushing it into the cage under the animal's nose.

See ETHER; SURGERY; ANAESTHETIC.

Chlorophyll, klō′rō-fĭl, the green coloring matter of plants. The term is Greek and means leaf green. Chlorophyll is a granular pigment contained in the living cells, especially the young cells, of plants. Sunlight is required to bring out its color. Plants kept in darkness for a time become white and waxy. The grains of coloring matter accumulate usually in the upper cells of a leaf, giving that surface a greener color than the under parts. The reds and other brilliant colors of autumn foliage are due to the combination of various minerals with the green pigment of chlorophyll. Hardened tissues and autumn frosts facilitate the operation. Chlorophyll is an important agent in the digestion of plant foods, its function being to combine into starch the carbon dioxide absorbed from the air through the pores with the water taken up by the roots. Free oxygen is given off, thus serving as a purifier of the air.

Choate, Joseph Hodges (1832-1917), an American lawyer and diplomatist who was born at Salem, Massachusetts. He was a nephew of Rufus Choate. His education was received at Harvard University and Law School. He settled in New York where he acquired reputation rapidly as an orator and pleader at the bar. He was one of the Committee of Seventy which broke up the corrupt Tweed ring in the city government of New York; conducted the income tax cases before the Supreme Court, and represented the United States in the Bering Sea Controversy. Under President McKinley, Mr. Choate was appointed Ambassador to Great Britain, in which capacity he served until 1905, when he again took up the practice of law in New York.

Choate Rufus (1799-1859), an American lawyer, orator, and statesman. He was born at Essex, Massachusetts, October 1, 1799, and died at Halifax, Nova Scotia, July 13, 1859. He was graduated at Dartmouth in 1819. He took up the practice of law at Danvers, but removed to Salem in 1828. He was elected to Congress in 1830 and again in 1832. He resigned in 1834 to enter an office in Boston. He succeeded Daniel Webster in the United States Senate in 1841, and served the unexpired term. Mr. Choate was a brilliant public speaker. After Mr. Webster's death he was considered the orator of the state and the leader of the Massachusetts bar. His style was florid, his sentences long and involved. Webster himself once said, "When I was a young man, and first entered the law, my style of oratory was as round and florid as Choate's. I do not think it the best. It is not according to my taste." Mr. Choate's style may be inferred from the following passage from his *Eulogy on Webster:*

> But there were fields of oratory on which, under the influence of more uncommon springs of inspiration, he exemplified an eloquence in which I do not know that he has a superior among men. Addressing masses by tens of

thousands in the open air, on the urgent political questions of the day, or designated to lead the meditations of an hour devoted to the remembrance of some national era, or of some incident marking the progress of the nation and lifting him up to a view of what is and what is past, and some indistinct revelation of the glory that lies in the future, or of some great historical name, just borne by the nation to his tomb—we have learned that then and there, at the base of Bunker Hill, before the corner stone was laid, and again when from the finished column the centuries looked on him; in Faneuil Hall, mourning for those with whose spoken or written eloquence of freedom its arches had so often resounded; on the rock of Plymouth; before the capitol, of which there shall not be one stone left on another, before his memory shall have ceased to live—in such scenes, unfettered by the laws of forensic or parliamentary debate; multitudes uncounted lifting up their eyes to him; some great historical scenes of America around; all symbols of her glory and art and power and fortune there; voices of the past not unheard; shapes beckoning from the future, not unseen—sometimes that mighty intellect, borne upwards to a height and kindled to an illumination which we shall see no more, wrought out, as it were, in an instant, a picture of vision, warning, prediction; the progress of the nation; the contrasts of its eras; the heroic deaths; the motives to patriotism; the maxims and arts imperial by which the glory has been gathered and may be heightened—wrote out, in an instant, a picture to fade only when all record of our mind shall die.

Chocolate. See COCOA.

Choctaws, a tribe of Mobilian Indians related to the Seminoles, Chickasaws, etc. In 1540, when De Soto marched westward, they occupied a large extent of territory between their eastern neighbors, the Creeks, and the Mississippi River. They are said to have had forty towns and to have numbered 2,500 warriors. They opposed his progress at Choctaw Bluff, Alabama. In the battle that followed twenty of De Soto's men were killed, and two hundred wounded. The Choctaws were a corn-raising, peaceful people. They gave the settlers far less trouble than the warlike Creeks and the Chickasaws. Nevertheless they were forced to migrate. Between 1785 and 1837 they gave up 30,000 square miles of land in exchange for $2,225,000 in money and goods, and moved to Indian Territory. There they became landholders. They established schools, governed themselves by a legislature, loafed, hunted, farmed, raised stock, and became quite civilized. They still number 10,321—rather more than when the white man first found them. A few hundred still linger along the streams of the Mississippi. See INDIANS.

Choir, kwīr, a body of singers organized to render music in church services. Not infrequently the term is applied to those who lead congregational singing. A choir consists of at least four voices—soprano, alto, tenor, bass. In cathedral services the choir is divided usually into two sets of voices for responsive singing, one sitting on the north, the other on the south of the chancel. For a discussion of the term used in an architectural sense, the reader is referred to the article on CATHEDRAL.

Choke-Damp, the name given by miners to the suffocating gas formed by the explosion of fire-damp. Also called black-damp and after-damp. Roughly speaking, fire-damp is a gas of carbon and hydrogen likely to explode in air. Choke-damp is a compound of carbon and oxygen not poisonous but incapable of supporting life. See DAVY; CARBON DIOXIDE.

Cholera, kŏl′er-ȧ, an acute, infectious disease—not infrequently an epidemic. Like typhoid, malaria, and the bubonic plague, it is thought to be due to colonies of a bacillus. Though the germ theory has not been as yet accepted by all authorities, it is settled fairly well that cholera is due to a spiral bacterium. Cholera is an Eastern infection known in the East Indies at the dawn of history, but it did not spread to Europe and America until 1830 and later. It is often called Asiatic cholera. It has a peculiar way of making long leaps, leaving intermediate districts unmolested. The first symptom of cholera is vomiting, followed by griping pains in the stomach. The disease is very fatal. A large proportion of those attacked die within an hour or two. Opium, quinine, whiskey, camphor, and chloroform are some of the common remedies. Cleanly conditions, high, pure air, and simple food are preventives. It is one of the diseases which medical science has not mastered. The introduction of germs is guarded against by rigid quarantine in seaboard cities. See DISEASE.

Choosers of the Slain, or **Valkyrior,** văl-kĭr′ĭ-or. See ODIN.

Chopsticks, utensils used by the Chinese to convey food to the mouth. The chopsticks, two in number, are sticks of wood, bamboo or ivory about twelve inches in length and one-fourth inch in diameter. Both are held in one hand and are used with wonderful skill and ease. Americans who have lived in China and become accustomed to the use of chopsticks, consider them oftentimes of greater convenience than the fork. It must be remembered that, as Chinese food is served, a knife is unnecessary.

Chopin, shō-păn′, **Frederic** (1809-1849), a noted Polish pianist. A native of Warsaw. His later years were spent in Paris. He was a brilliant player and the composer of a large number of instrumental pieces for the piano. A list of about eighty of his compositions, including a famous funeral march and many polonaises or Polish dance tunes, is well known to pianists. The peasant music of Poland proved a rich field for Chopin to whom the musical world is as truly indebted for finding, arranging, and recording Polish dancing music as the literary world is to the compiler of the traditions of Robin Hood or of the Knights of King Arthur's Round Table.

Chorus, originally a dance in a ring, or a dance within an enclosure. The word came to be applied to a band of dancers. Then, probably because the dance was accompanied with song, to a band of singers. The chorus of the Greek drama was a band of performers, represented as of age, sex, and condition appropriate to the play, who appeared as spectators of the entire action. The chorus occupied, in the theater, the position between the stage and the auditorium. Through the coryphaeus, or leader, the chorus took part in the dialogue with the actors. When no actor was on the stage, the chorus sang such sentiments as would seem to have been suggested by the events presented, or supplied necessary information that could not be given in the regular speeches. As the members of the chorus sang they danced, or moved about the altar of Bacchus. The chorus was considered indispensable. At one time as many as fifty persons were included in the Greek chorus. Later the number was limited to fifteen for tragedy, twenty-four for comedy.

Chouan, shōō′an, a French word meaning screech owl. The term was applied as a nickname to the peasant leader of an insurrection in Brittany in 1792. His followers were subsequently called the Chouans. They rose partly by reason of poverty and partly out of loyalty to the royal family and to the church. They gave the young French republic much trouble by adopting guerilla tactics. They were not put down till 1800, nor wholly, in fact, till the restoration of the Bourbons in 1815 gratified their wishes. The uprising of the Chouans in favor of the Bourbon family has points of resemblance to that of the Highlanders for the Stuarts. The two peoples are of the same blood. The leading accounts in fiction are Balzac's best novel, *The Chouans,* and Victor Hugo's novel, *Ninety Three.* See CELTS; BRITTANY.

Chremhild, krēm′hĭlt, heroine of the Nibelungenlied. See NIBELUNGENLIED.

Christ. See JESUS CHRIST.

Christabel. See COLERIDGE.

Christ's Hospital, a celebrated charity school in Newgate Street, London. The word hospital formerly meant an institution for furnishing hospitality to, or caring for, the needy. Hence the name was given frequently to charity schools. The school was founded in 1653 by Edward VI for orphan children. At some times as many as a thousand boys and girls have been in attendance, receiving board, clothes, and instruction. The boys wear a very noticeable uniform—a long blue woolen coat, with clergyman's bands at the neck, a red leather belt, yellow silk stockings, low shoes, and no hats. From this costume, they have been called Bluecoat boys and the school is commonly known as the Bluecoat School. Many noted Englishmen received their early education at Christ's Hospital—Coleridge, Lamb, and Leigh Hunt among them. In the days of Coleridge and Lamb, the life was a hard one. The food was poor and scanty, the work wearisome, hol-

idays few, and floggings many and severe. In the *Essays of Elia* Lamb has written an account of this school and his friendships there, under the title, *Christ's Hospital Five and Thirty Years Ago*. Christ's Hospital has been for some years under a new and much improved scheme of management. The result has been a great gain in its standing and influence.

Christian IX (1818-1906), king of Denmark. Although not in the regular order of succession, Christian came to the throne of Denmark in 1863, succeeding Frederick VII. The early part of his reign was unfortunate in many respects. Although Schleswig had been guaranteed its own government under the personal rule of the Danish king, he incorporated it with Denmark. The people rose in revolt supported by those of Holstein. Bismarck seizing the opportunity, went to the assistance of the duchies and the result was their annexation to Prussia. The loss of Schleswig-Holstein antagonized the Danes against their king and this antagonism aroused Christian's distrust of all popular government, a feeling that characterized his entire administration. As far as he constitutionally could he ruled always for the people, never with them. In spite of his ultra-conservatism he was popular with his subjects, but it was because they believed in his personal sincerity while opposing his political ideas. No other ruler of modern times has had as many important family connections with the ruling houses of Europe. One daughter is empress dowager of Russia, the widow of Alexander III; Alexandra of England, wife of Edward VII, is another daughter.

Christian X., (1870-) King of Denmark, is the son of King Frederick VIII and Queen Louisa; he succeeded to the Danish throne on the death of his father, May 14, 1912. During his reign his country has seen some important changes. On June 5, 1915, King Christian signed the new constitution which brought with it many needed changes, especially the one granting equal suffrage to the Danish people. On April 11, 1916, the reform of the Administration of Justice, which separated the administrative and judicial systems, took place. But to the Danish people the most important event was the reunion of the Danish part of Schleswig with Denmark, which occurred in 1920.

Christian Endeavor, United Society of, an inter-denominational society of young people founded in 1881, with the object of training young converts for church membership and work relating thereto. The movement has become very popular, and its growth has been rapid. Its activities are divided as follows: Junior, Intermediate and Senior societies, and Alumni Councils. In 1921 the societies totalled 67,099, 9,238 being organized in 1919 and 1920. In foreign countries there were 22,507 societies, besides 65 floating societies, and 29 army societies.

The movement has shown a steady progress in the United States and Canada, and the reports from foreign countries are encouraging. There are flourishing centers in Hungary, Poland, Finland and Mexico. Recent statistics show that there are 40,408 societies in the United States, with a membership of 2,000,000, and in Canada 4,090 societies, with a membership of 200,000. In Germany there are 1,020 societies with a membership of 32,000. There are over 2,000 societies in India, and more than 1,200 in China. In Brazil there were recently 110 societies with a membership of over 3,600.

Christian Science, a system of theology and therapeutics developed by Mrs. Mary Baker Eddy. Mrs. Eddy states that she discovered the principle of Christian Science in 1866, through the study of the Bible, which book the denomination accepts as the inspired Word of God. It is difficult to state the creed or doctrines of Christian Science in a few words. Its fundamental principle is God—that is, an understanding of the true nature of God. Christian Scientists deny the existence of matter as a reality. All material things are but manifestations of the mortal mind of man. The only true Mind is God, of whom man is the spiritual image and likeness. Disease, sin, poverty, in fact all evils are errors, having no more reality than have the terrifying images we see in dreams. It is believed that the cures wrought by Jesus

Christ, were not miraculous but were in accordance with Divine Law, and Christ's command to his disciples, "Heal the sick," was a command not only to the twelve and to the seventy, but to all those of any age who acknowledge Him as their Master.

The first Christian Science Church was established in Boston in 1879. It is known as the "Mother Church." In 1894 the first church edifice was erected in that city at a cost of $250,000. Eight years after it was built, a larger structure became necessary. The church voted to apply any necessary part of $2,000,000 to this purpose. The extension, erected on a lot adjacent to the first church was dedicated in 1906, at which time 40,000 Christian Scientists assembled in Boston to attend the service. There were at that time in existence in various parts of the world 930 Christian Science Churches and Societies. Since then the denomination has issued no statistics, but its growth has been more rapid than at any previous period. The form of church government is congregational, that is, there is no central government. The manual of the "Mother Church" serves as a model for other church manuals. No pastor is employed; a "First Reader," and "Second Reader," appointed from among the congregation for a period of three years, conduct the services. Almost every church maintains a reading room where Christian Science literature may be read or purchased. A Board of Lectureship delivers lectures in various cities under the auspices of local churches. The Christian Science Publishing Society issues a weekly paper, the *Christian Science Sentinel,* and a monthly, *The Christian Science Journal*, founded in 1883. The *Christian Science Monitor* is a daily newspaper. The first issue appeared November 24, 1908. It is not designed to propagate the doctrines of the denomination, but is a regular newspaper, differing from other such sources of information in that nothing unwholesome or sensational ever appears.

The instances are few in the world's history where a system of religious or philosophical teaching has made greater progress than has Christian Science. Although its principles may be rejected its influence has had its effect. It was the first step in the reaction from the intensely materialistic to the more spiritual mode of thought. As a result numerous movements of a more or less similar character have sprung up. Notable among them is the Emmanuel Movement instituted by Rev. Dr. Elwood Worcester and Rev. Samuel McComb in the Emmanuel Episcopal Church at Boston. This movement resembles Christian Science only in the fact that it combines religion and therapy. Its theory is entirely another matter. Sin and disease are treated as realities. The methods of healing employed are in accordance with the views of leading psychologists and neurologists. Moreover, no attempt is made to cure organic diseases. The plan of work in the Emmanuel Church has been followed by other churches of various denominations throughout the country and classes are organized for the moral and mental treatment of nervous disorders.

Mind Cure, Faith Cure, Mental Science, Metaphysical Science, Metaphysical Healing, New Thought, are terms one hears on every side. They designate various, though frequently rather loosely defined methods of the drugless healing of disease. Mrs. Eddy and the Christian Science denomination as a whole have made special and earnest effort to keep their particular views entirely distinct from any form of therapeutics which admits the reality of evil in the form of sickness or disease. See EDDY, MARY BAKER; SCIENCE AND HEALTH.

It (Christian Science) is the only world religion, so far as we can now remember, that had its rise in an English-speaking country, and is the only new one that has been created for centuries. Wonderful spiritual forces must have been set at work to accomplish this marvelous result. Somewhere in it must be germs of truth. Otherwise its story would be utterly inexplicable. No other recent cause has had such tremendous territorial extent, either in this country or in the world. All these things must be conceded by those to whom Christian Science is utterly enigmatical or anathema. These cannot understand the theory of its application, but they must admit the beneficent results that often come from this treatment and they recognize the satisfaction which Mrs. Eddy had a right to feel over the triumph of her cause. Few founders of a religion have been so rewarded in beholding the tangible success of their labors. Most of these founders died in ignominy and defeat.—*Boston Transcript.*

Christiania, the capital and metropolis of Norway. It is situated at the head of a fiord or inlet of the same name, about sixty miles from the open sea. The site is picturesque, being an amphitheater surrounded at a distance by high hills. The present city was founded in 1624 by Christian IV, whose name it bears. The port is defended by the fine old castle of Akershus, dating from 1300. The royal palace, the cathedral, the university founded in 1811, with its library and museums, are among the prominent buildings of the city. The city is screened from the north winds and enjoys a much milder climate than St. Petersburg. There are extensive breweries and manufactories of woolen cloth, soap, glass, tobacco, paper, and iron ware. The principal exports are lumber and iron. The harbor is closed by ice for about two months in the dead of winter. The population of the city proper is given at 259,445. With its suburbs and port, the city has not far from one-third of a million inhabitants. See NORWAY.

Christianity, the religion of Jesus Christ. It may be said to have been founded at his death by the dispersal and preaching of his disciples. Although the doctrines of Christianity are derived from the Hebrews, the Hebrews refuse to be reckoned as Christians. Christianity took root in Asia Minor, Greece, Rome, and northern Africa. As contrasted with Mohammedanism, Buddhism, and other great religions, it is now the prevailing religious faith of all Europe, Turkey excepted, Armenia, the Coptic people including Abyssinia, Australia and the surrounding islands, and both Americas. The Russians have carried Christianity into northern Asia; the English have carried it to India; missionaries have carried it everywhere. There are said to be at least 1,000,000 Christians in the Chinese Empire. The African colonies of the various European powers are, in large part, Christian.

The present branches of Christianity are as follows:

Churches.	Total Followers.
Catholic Church	230,866,533
Protestant Churches	143,237,625
Orthodox Greek Church	98,016,000
Church of Abyssinia	3,000,000
Coptic Church	120,000
Armenian Church	1,690,000
Nestorians	80,000
Jacobites	70,000
Total	477,080,158

Dr. Zeller, director of the German Statistical Bureau, writing in 1910, claimed 537,940,000 persons for Christianity; about one-third of the world's total population.

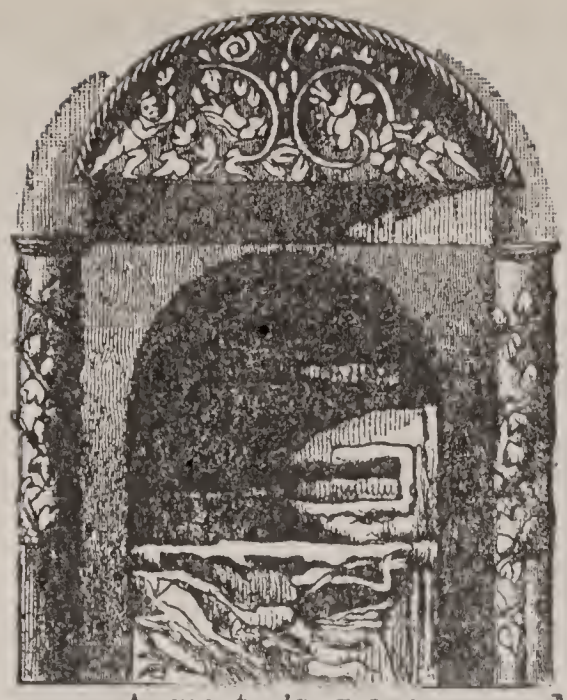
Christianity may be regarded as a religion and as a civilization. In the latter respect it differs very considerably from the precepts of Christ. Christ enjoined peace. Christians are noted for conquest and fighting. Regarded as a civilization, rather than as a religion, it may be said to have followed the flags of the nations of Europe ever since the day of Charlemagne.

The following shows the membership of the leading denominations in the United States in a recent enumeration:

Methodist Episcopal	3,877,600
Methodist Episcopal (South)	2,218,844
African Methodist Episcopal	551,766
Colored Methodist Episcopal	271,078
African Methodist Zion	460,280
Methodist Protestant	186,873
Roman Catholic	17,885,648
Regular Baptist (North)	1,253,878
Regular Baptist (South)	3,199,005
Regular Baptist (Colored)	3,116,325
Primitive Baptist	80,311
Presbyterians (North)	1,655,534
Presbyterians (South)	397,058
United Presbyterian	160,528
Protestant Episcopal	1,104,029
Disciples of Christ	1,210,023
Congregationalist	819,225
Lutheran Synodical Conference	672,049
Lutheran General Council	441,118
United Lutheran Church	770,384
Norwegian Lutheran	250,344
Lutheran Ohio Synod	143,903
Lutheran Synod of Iowa	132,269
German Evangelical Synod	274,860
Evangelical Association	123,568
United Brethren	376,182
Latter Day Saints	587,701
Reformed	331,369
Spiritualists	105,837
Greek Orthodox	411,054
Adventists	134,725

Christmas, the anniversary of the birth of Christ. It is observed on the twenty-fifth day of December—one week before the New Year. The celebration dates from the fourth and fifth centuries. Among

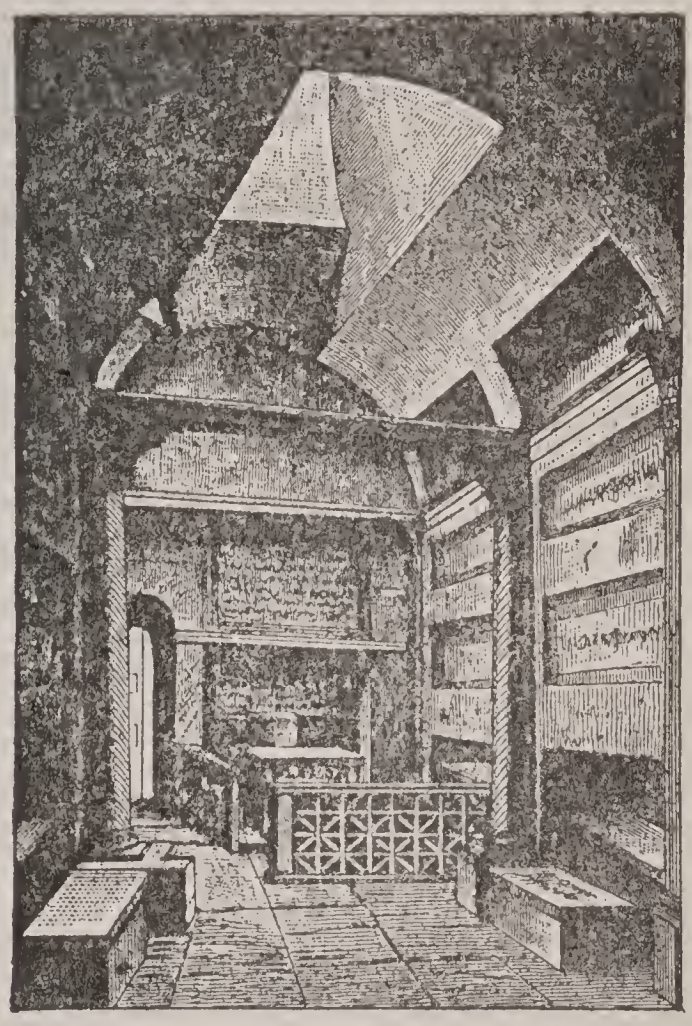
The Good Shepherd, Crypt of St. Agnes, Rome.



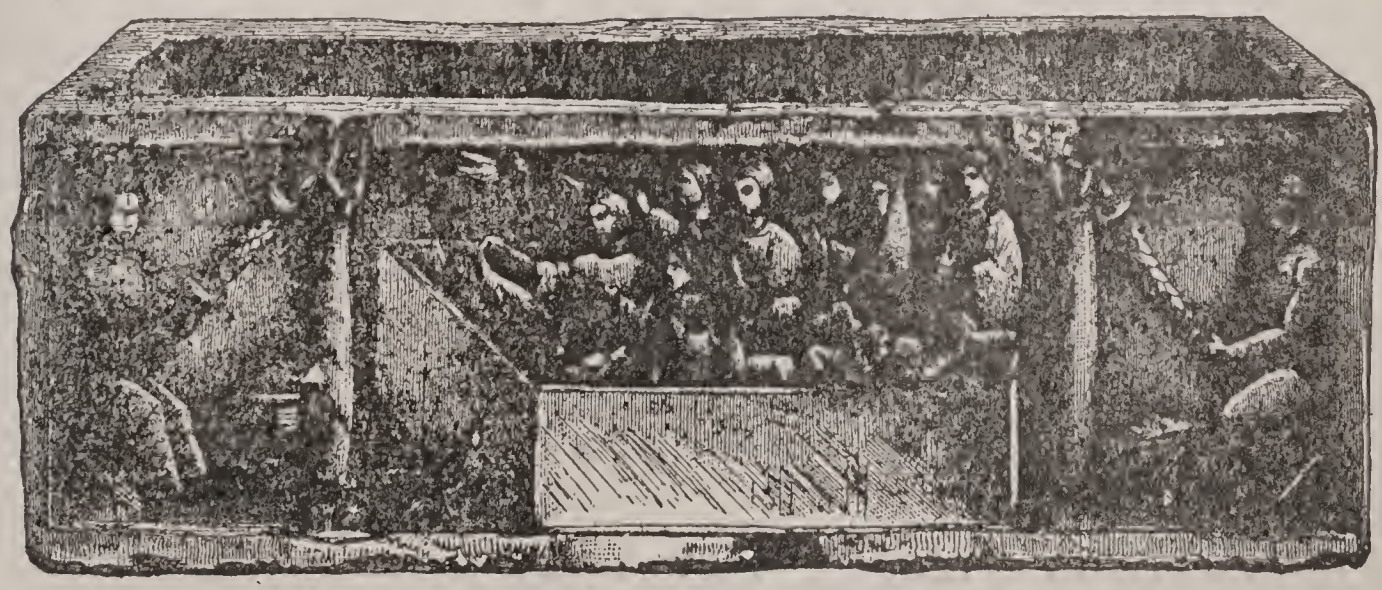
A martyr's grave, Catacombs, Rome.

Moses striking the rock, Crypt of St. Agnes, Rome.

A catacomb, present condition.



Same, restored.



Sarcophagus, with Noah's Ark in relief, Treves.

CHRISTIAN ANTIQUITIES.

the Romans certain Christian practices were adopted from an older pagan feast in honor of the birth of the sun or Sol. Among people of Germanic ancestry, including the English, the celebration of the Christmas season, with holly, mistletoe, wassail, and the Yule log, are relics of an old pagan festival commemorating the shortest day of the year. The custom of making presents at Christmas time is associated in the popular mind with the gifts presented to Christ by the Wise Men of the East; but in reality, at least so far as English-speaking people are concerned, it is derived also from an old heathen usage. The custom of decorating Christmas trees has been traced from Rome to Germany, from Germany to England, and from England to the United States. The prejudice against Christmas observance, as too strongly tinctured with the heathen tradition, was so strong in Scotland that, until recently, children in Presbyterian families had no Christmas. Even yet it is not a popular holiday in Scotland. In New England at an early day, it was considered inappropriate—irreverent—to celebrate Christ's birthday with feasting, gift giving, and jollity. See NICHOLAS, SAINT; HOLLY; MISTLETOE.

I heard the bells on Christmas Day
Their old familiar carols play,
And wild and sweet
The words repeat
Of peace on earth, good-will to men.
—Longfellow.

Christmas Stories, a collection of tales by Charles Dickens. It was Dickens' custom to write each year some Christmas tale or a short magazine sketch that would lead families to live in happiness and harmony. Collected in book form, the *Christmas Stories* comprise about fifteen short stories and five of somewhat greater length. Some stories are included which are not distinctively Christmas stories. The best known of these tales are *A Christmas Carol,* published in 1844, *The Chimes,* 1845, and *The Cricket on the Hearth,* 1846. These are the best Christmas stories ever written. Lord Jeffrey said that since Christmas, 1842, Dickens "had done more good, and not only fostered more kindly feelings, but prompted more positive acts of benevolence, than can be traced to all the pulpits and confessionals."

A Christmas Carol is the tale of a rich, miserly, hard-hearted old fellow, who, under the guidance of a ghost and three spirits, is awakened from his selfishness to feelings of generosity and human kindliness. Thackeray says of it:

Was there ever a better charity sermon preached in the world than Dickens's *Christmas Carol?* I believe it occasioned immense hospitality throughout England; and was the means of lighting up hundreds of kind fires at Christmas-time; caused a wonderful outpouring of Christmas good feeling; of Christmas punch-brewing; an awful slaughter of Christmas turkeys, and roasting and basting of Christmas beef.

The Cricket on the Hearth is a picture of domestic happiness and contentment. The progress of the story gives glimpses of possible misery—such misery as selfishness and disloyalty may bring—but all ends happily. Everybody develops the "capacity of being jovial" and of hearing the cricket's chirp, the fairy voices and "everything that speaks the language of hearth and home."

The Chimes is a "Goblin Story of Some Bell That Rang an Old Year Out and a New Year In." It shows us something of the deprivations and sorrows of the poor, but more of the blessing and happiness that may be theirs; something of the harm done by "fears and jealousies, and doubts and vanities, more of the good accomplished by the honest affection of those "who trust and hope, and neither doubt themselves nor doubt the good in one another."

In came Mrs. Fezziwig, one vast substantial smile.

Christopher North. See WILSON, JOHN.

Christopher, Saint, a saint of the Roman Catholic and Greek churches. He was supposed to have suffered voluntary martyrdom in the third century. The story runs that he was put to the torture by the prefect Dagnus, that nothing could be found to harm him, but one of the poisoned arrows shot at him rebounded and injured the eye of Dagnus. In pity Christopher laid his own head upon the block knowing that his blood would heal the

wound of his tormentor. Dagnus' eye was restored and he was converted to Christianity. According to the old legend, Christopher's name had been Adokimos, which means the Unrighteous. He was a native of Syria, and a man of gigantic stature, measuring twelve feet in height, well proportioned and strong. Proud of his size and strength, he determined to devote his power to the service of the greatest of rulers. He therefore found, as he believed, the most powerful prince on earth and served him faithfully. But one day, while journeying through a lonely country, they came to a place where two roads met. The prince made the sign of the cross. "Why do you do that?" asked Adokimos, who was a heathen. "For protection against the power of Satan," answered the monarch. "Then, if you fear Satan, he is more powerful than you, and henceforth I will serve Satan." So the giant served Satan. Once, however, in a wood he saw Satan tremble before an image of Christ, and immediately he forsook his master and sought for Christ that he might serve the most powerful only. For long he searched in vain, but at last a pious hermit taught him of Christ and baptized him. But Adokimos said, "I cannot spend my life in prayers and fasting; I should then lose my strength and that is all I have." So the wise hermit stationed the giant in a little hut beside a stream which holy pilgrims often wished to cross, and bade him bear over such travelers on his mighty shoulders. For many years Adokimos lived beside the river and patiently and faithfully performed his task. By a miracle his name was changed to Saint Christopher.

St. Christopher was invoked by the people during times of pestilence and other dangers. He was the patron of an order of moderation, founded in Austria in 1517, for the purpose of checking swearing and excessive drinking.

Christy, Howard Chandler (1873-), an American painter and illustrator, was born in Morgan County, Ohio. He studied at the National Academy and the Art Students' League in New York. He went to Cuba with the "Rough Riders," and saw the fighting before Santiago. Mr. Christy's letters and his illustrations of the Spanish-American War, published in *Harper's,* and other periodicals, attracted attention to his work. His black and white illustrations of serial stories in popular American magazines are well known. Since 1920, he has devoted considerable time to portrait painting.

Chromium, krō′mĭ-um, a hard metal known chiefly to chemists. The name is derived from chrome, meaning color, and was given to this substance because it produces many-colored compounds. It has a bright, metallic luster, and is capable of a high polish, but it is difficult to melt. In nature it occurs in combination with iron ore. Naturally its production may be expected chiefly in iron regions. It is found abundantly in several states of the Union, but at present California is the American source of supply. It is produced in the Ural Mountains, in Greece, and in Austria, but the world's supply comes chiefly from a mine near Brusa in Asia Minor. By itself the element chromium is of no particular importance, but its compounds are valuable. A small amount added to steel produces so-called chrome steel, noted for its hardness. It is used in the manufacture of burglar-proof safes and edged tools. Chrome yellow and chrome green are used in staining glass, glazing porcelains, and as mineral dyes. In combination with potash, chromium is used in calico printing. The beautiful green of the precious emerald stone is thought to be due to a trace of chromium.

Chronicles. See BIBLE.

Chronology, the science of dates. The Chinese reckon their dates from the accession of the reigning emperor. The Greeks reckoned from the alleged beginning of the Olympic games, which, according to their traditions, was about the year 776 B. C. The Romans reckoned from the traditional founding of their city (753 B. C. by our reckoning). After the establishment of the empire, they dated by the reigns of the emperors. This remained the fashion of the Christian world until nearly the year 800 of our present reckoning. At that time the popes of Rome had been waging a century of struggle against

the emperors at Constantinople for virtual independence, and Pope Hadrian signalized the papal victory by ceasing to date events by years of the reigning emperor. Instead, he called a certain day "December 1, of the year 781, under the reign of the Lord Jesus Christ, our God, and Redeemer." The Christian world, except for the Greek Church, has dated time ever since from the birth of Christ, as figured by Hadrian, shortening the expression to "year of our Lord" (in Latin, *Anno Domini,* or A. D.). It is worth noting that Hadrian erred four years in his computation. He should have made his year 785. Because of this error we are obliged to say that Christ was born in 4 B. C. The Greek Church reckons from the creation of the world, which makes its dates 5,508 years greater than ours.

In nearly all systems the year is the unit. Among the Greeks, however, the period was one of four years, or an olympiad, the interval from one Olympic game to another. The end of the tenth olympiad was ten times four years later than 776 B. C. To find the second year of the eleventh olympiad in our reckoning, we should add two years to four times ten years, and subtract the result, or forty-two years, from 776 B. C. The Mohammedans reckon from the Hegira, or flight of Mohammed, which occurred in the year of 622 A. D. To change a Mohammedan date, therefore, into our reckoning, it is necessary to add 622 years. Without doubt a time will come when all commercial people will use the same system of chronology,—possibly that now in use among English-speaking people.

See CALENDAR; YEAR; DAY; MONTH.

Chronometer, the most accurate of all instruments for measuring time. In a general sense and translating the word literally, any time-measuring instrument is a chronometer—a sun dial, clock, watch or hour glass. Specifically, however, a chronometer is more sensitive and accurate than any other device. The most widely known chronometer is the marine chronometer, used to determine time in connection with finding positions at sea. It is set at some first, or prime, meridian—Greenwich, Paris, Berlin—according to the nationality of the ship. The instrument is so delicate that it must be hung in its case on gimbals so as to be influenced as little as possible by the ship's vibration and so as to assume always the horizontal position; and is always set as far as possible away from the magnetic influence of the compass. A pocket chronometer, used on railroads and for race-time calculation, looks like an ordinary watch but measures much smaller fractions of time.

Chrysalis, krĭs′ă-lĭs. See BUTTERFLY.

Chrysanthemum, krĭs-ăn′the-mŭm, a flowering herb belonging to the aster family. The name is Greek, meaning golden flower, having reference to the yellow straps of the corolla. The original type had but a single row of strap-shaped flowers. The double varieties have been obtained by causing the small, five-pointed corollas of the disk flower to develop into straps. The florists of China and Japan excel in the cultivation of this flower. Our large flowered varieties are obtained from a blending of two species that grow wild in China and Japan. Although the original color was yellow, the florist now produces white, pink, bronze, and crimson, as well as saffron-colored varieties. Botanically the common ox-eye daisy, or white-weed, and the marguerite flower are chrysanthemums.

Chrysippus (280-207 B. C.), a stoic philosopher, of Soli in Cilicia. He came to Athens when a youth and devoted himself to philosophical studies. He possessed a versatile mind, and was said to be the cleverest disputant of his time. He was prolific as a writer, Diogenes Laërtius mentioning over 705 books written by him, the subjects being pholosophy proper, logic, physics, ethics, grammar and the interpretation of the poets. Only fragments of his writings remain.

Chrysoberyl, a native compound of aluminium and beryllium, containing a little iron. It is usually of a pale green or a yellowish tint, and is semi-precious. The greenish varieties are called cat's-eye, while the opalescent ones are named cympohane. The ancients were familiar with chrysoberyl, calling it oriental topaz. Another

variety, alexandrite, is of an emerald-green color, and was named in honor of Alexander II of Russia. It is found at Haddam, Connecticut; in the Ural Mountains, Brazil and Ceylon, and in Norway, and other localities in Europe.

Chrysolite, a magnesium iron silicate, varying in color from green to a yellow or brown. It is semi-precious, and when transparent is cut and used as a gem. It is found in the United States in Arizona and New Mexico, and also occurs in some parts of Canada. It is found in the volcanic rocks of the Azores and the Hawaiian Islands, and also in the lava of Vesuvius.

Chrysoprase, a light green variety of chalcedony, the color due to its containing a small quantity of nickel oxide. It is found in the United States in parts of Oregon and in California, in Germany and in Silesia. It was formerly semi-precious and used as a gem, but it was discovered that it lost its color in a warm place, and so lost some of its vogue. It was known to the ancients, and was described as a gem of color varying from green to yellow.

Chrysocolla, an ore of copper, found in green to blue masses with a texture like enamel. The impure varieties are often found in earthly masses, green or brown in color. It occurs in the upper part of veins with other copper minerals. It is found in Hungary, Siberia, Cornwall, England, Chile, Australia, and in Pennsylvania, New Jersey, Wisconsin, Michigan, Arizona and other parts of the United States, with other copper ores. When found in sufficient quantities, it is valuable ore of copper, since, when pure, it contains 45 per cent of copper oxide. Its name "chrysocolla" was given by the ancients to any mineral of green color, as malachite, which contained copper and could be used as a pigment.

Chrysoloras, Manuel (c. 1355-1415), a Byzantine Greek scholar, a noted teacher of Greek of the Renaissance. The fame of his learning spread throughout Italy and many prominent men came to learn from him. In 1396 he settled in Florence and taught Greek literature, and had as pupils many noted men. He later went to Pavia, where he translated Plato's *Republic* into Latin. Pope Gregory XII employed him to endeavor to bring about a union of the Greek and Roman churches. Accompanied by John XXIII, he went to the Council of Constance, and died there while it was in progress.

He wrote several books, among them one comparing ancient and modern Rome, but his most important work is his *Erotemata.*

Chrysostom, krĭs′ŏs-tŏm, **St. John** (347-407), the most famous of the Greek fathers and the author of voluminous works of a religious or ecclesiastical character. The name, Chrysostom, means golden-mouthed, and was given him on account of his eloquence. Chrysostom was born at Antioch of a noble family. He studied oratory under the sophist, Libanius, but was "stolen away to a life of piety" as his teacher expressed it. His mother's influence, it is believed, led him after six years spent in study and meditation in a desert, to enter the church. He was ordained deacon and presbyter at Antioch and in 398 was appointed Archbishop of Constantinople. In both cities Chrysostom by his zeal and eloquence gained enemies as well as friends. For such sins as idleness, simony, and immorality in monks or bishops under him he had no sympathy, but promptly punished the offense by deposing the offender or turning against him the power of his eloquence. He lessened the expenses of church and ecclesiastics, bestowing the money thus saved in charity and winning the name of "John the Almoner" thereby. Not even the court escaped his efforts at reform; with fiery eloquence he attacked its evils from the pulpit, neither magistrates, ministers, court ladies nor the empress herself escaping. He was tried for heresy, condemned and banished to Nicæa. But the common people loved Chrysostom, and they besieged the palace with such irresistible fury that the emperor recalled him. The court did not mend its ways, however, and Chrysostom's "golden mouth" continued to inveigh against it. He was banished again, to the Taurus Mountains this time. Even here the sympathy of his friends reached him and his letters continued his influence. At last the emperor ordered his removal to

the extreme corner of the eastern empire. He was made to take the journey on foot, bareheaded, beneath a burning sun. He was an old man, much spent with labor and an ascetic life, and before the shore of the Black Sea was reached, he died. Thirty years later his bones were brought back to Constantinople with great pomp and the emperor publicly prayed that heaven would pardon the guilt of his ancestors. The Greek church celebrates November 13 in honor of St. Chrysostom; the Roman church, January 27.

Chuck-will's-widow, a bird of the goat-sucker family, allied to the whip-poor-will, but larger. Its notes and habits are like those of the whip-poor-will. It feeds on the wing by catching insects. It has an enormous mouth. Chapman is authority for the occurrence of humming birds and sparrows in its stomach, which he kindly covers with the mantle of charity by suggesting that these small birds may have been mistaken for large moths. Two dull white eggs, with lilac markings, are laid on the ground or on leaves in thickets and groves. See WHIP-POOR-WILL.

Church, a term applied to a body of religious believers; also to the buildings in which worship is held. The twelve largest church edifices in the world are as follows: Milan cathedral, with seating or standing capacity for 37,000; St. Peter's, 32,000; St. Paul's, 25,600; San Petronio, Bologna, the Florence cathedral, and the Antwerp cathedral, about 24,000 apiece; St. Sophia, Constantinople, 23,000; St. John Lateran, Rome, 22,900; Notre Dame, Paris, 21,000; Pisa cathedral, 13,000; the cathedral of the City of Mexico, the cathedral of Notre Dame in Montreal, and St. Stephen, Vienna, 12,400. With the exception of St. Paul's, which belongs to the Church of England, and St. Sophia, which belongs to the Greek Church, these edifices are all Roman Catholic churches. See CATHEDRAL; BASILICA; TEMPLE.

Church, Frederick Edwin (1826-1900), a noted American landscape painter, was born at Hartford, Conn. Mr. Church first came into prominence when he exhibited his *View of East Rock, Near New Haven,* and *Scenes in the Catskill Mountains.* In 1855 he went to South America, traveling extensively over that continent. He traveled also in Europe, Labrador and the Holy Land. In each of these countries Mr. Church found materials for his later pictures. Shortly after his return he executed his *View of Niagara Falls from the Canadian Shore,* by some authorities considered the finest representation of the Falls. Other well known works by Mr. Church are *The Parthenon; Sunrise on Mount Desert Island; Damascus; Jerusalem; Cayambe, South America,* and *Landscape, South America.*

Churchill, Randolph Henry Spencer, Lord, (1849-1895), an English statesman, son of the sixth Duke of Marlborough. He was educated at Eton and Oxford. In 1874 he entered Parliament, where he soon became a leader of the Conservative Party, and thenceforth was prominent in British politics. After a year as secretary of Indian affairs, he became chancellor of the exchequer in 1886 and leader of the Conservatives in the House of Commons. Owing to differences with his colleagues he resigned in a short time, but re-entered Parliament in 1892, where he served the remaining three years of his life.

Churchill River, one of the largest streams of Canada, and with the exception of the Saskatchewan-Nelson system, the greatest of the rivers which flow from western Canada into Hudson Bay. Its irregular drainage basin comprises over 100,000 square miles. Its source and upper course are close to the low divide which separates the rivers which flow to Hudson Bay from those which flow to the Arctic Ocean. In fact, at one point in its course, about 300 miles from its source, the Churchill seems to be in direct connection with the Mackenzie River system, for the surplus waters of Wallaston Lake flow both northwest and southeast, through other lakes, into these two river systems. Throughout its course the Churchill flows through so many lakes that it is sometimes described as a chain of lakes connected by narrow, rapid channels.

In the early days of the Northwest, the Churchill was a vital route for the trappers

and traders for the upper half of its course was the direct line to the Mackenzie and Peace River country. Mink, otter, and other fur-bearing animals are still trapped along its banks, and the waters teem with fish. The mouth of the river forms the best natural harbor on Hudson Bay. The river was named for John Churchill, first duke of Marlborough, who was one of the early governors of the Hudson Bay Company.

Churchill, William (1859-), an American ethnologist and philologist, was born in Brooklyn and educated at Yale. He was on the editorial staff of the New York *Sun*. Among his works are *A Princess in Fiji; Eastern Island, Rapanui Speech and the Peopling of Southeast Polynesia; The Subanu, Studies of a Sub-Visayan Mountain Folk of Mindanao,* etc.

Churchhill, Winston (1871-), a popular American novelist. He was born in St. Louis, Missouri. He was graduated from the United States Naval Academy in 1894, and became an editor of the *Army and Navy Journal*. Later he held the position of managing editor of the *Cosmopolitan*. His best known works are the historical novels, *Richard Carvel, The Crisis, The Celebrity, The Crossing, Mr. Crewe's Career,* and *Coniston*. In his later writings Mr. Churchill has shown a grasp of the way in which legislatures and courts may be, and too often are, manipulated in favor of special interests.

Churchill, Winston Leonard Spencer (1874-), an English statesman, soldier and author. Entering the army in 1895, Mr. Churchill saw service in India and in Egypt. By the time he was 24, he had received honorable mention and had won four military decorations. He was sent to Parliament in 1900; went with the Liberals in 1905 and was made Parliamentary Minister for the Colonies. In 1908 he became President of the Board of Trade; in 1910 was made Home Secretary; and in 1911 was appointed First Lord of the Admiralty. In this capacity Churchill kept the British Navy highly efficient, though he caused dissatisfaction over the campaign in the Dardanelles. Relieved of the Navy portfolio in 1915, he went to France as a major in the Grenadier Guards. In 1916 Mr. Churchill succeeded Lloyd-George as Minister of Munitions; and in 1920 became Minister of War. Among his writings are *Lord Randolph Churchill, The River War,* and *The Story of the Malakand Field Force.*

Churn. See BUTTER.

Churubusco, a village situated 6 miles south of the City of Mexico, on the river of the same name, and which is connected with the capital by an elevated passage way. It was at one time the capital of a powerful kingdom, and is said to have had lofty towers, temples, and thousands of dwellings, but in 1642 it was but a shabby village.

Here, on August 20, 1847, occurred an important battle between forces of the United States and Mexico. The Americans, to the number of about 9,000, under command of Gen. Winfield Scott, attacked with great gallantry some 30,000 Mexicans, under Santa Anna, and after three hours of fighting were successful in driving Santa Anna and his men from their position. The Americans lost in killed and including killed, wounded and prisoners, wounded about 1,100, while the Mexicans, fully 7,000.

Cibber, sib'êr, **Colley** (1671-1757), an English actor, dramatist, and poet. He was born in London. When eleven years old he was sent to the free school at Grantham where he made a record, not alone in his studies, but by writing an oration on the death of Charles II, and an ode on the accession of James II. Later he showed a passion for the theater and beginning by performing gratuitiously gradually established a reputation as an actor. In 1710 he became manager of the Drury Lane Theater continuing to act until 1733. He began to write early in his career as an actor, his first comedy, *Love's Last Shift,* appearing in 1696. This was followed by twenty-nine other comedies which enjoyed considerable popularity and for which it is claimed that they helped reform the stage since always the immoral characters return to the paths of virtue in the closing scene. Novelty, a young fop, is a character of many of these plays in the presentation

of which Cibber won distinction. In 1730 the dramatist was made poet laureate, but his poems were of no value and won him only ridicule. In 1740 he published an amusing autobiography, entitled *Apology,* of special value for the vivid picture it gives of the stage in the age of Queen Anne.

Cicada, sĭ-kā′dȧ, a large insect distinguished by a locust-like trill or chirp. It is allied to the bugs. The periodical cicada, or seventeen-year "locust," as it is improperly called, has a remarkable life history. Some summers the trees are full of cheeping cicadas. The noise is made by the male who takes no food and soon dies. It proceeds from two membranes stretched over cavities like a drum, and set in vibration by muscles. The females live a few weeks and lay their eggs in slits in the twigs of trees. In the fall the young nymphs drop to the ground and burrow in the earth. They attach themselves to the roots of trees where they suck the juices and burrow for years. The seventeenth summer they emerge from the ground again and fill the trees with chirpings, lay their eggs, and die. If there be but one brood in a locality, as is frequently the case, cicadas will be in evidence only every seventeenth year.

Inside of the limits indicated by southern Georgia, Kansas, and New England, over thirty broods have been located. One of these extends over a large area in southern New England. In some localities several broods are known to exist, dating from different years, thus appearing with seeming irregularity. South of the range of the seventeen-year cicada there are broods of a thirteen-year species. The large harvest fly of black and green, with its sharp midday trill, is a two-year cicada. There are two broods of this species. so that each summer has its adult brood.

Like the grasshopper and the cricket, to which it is not in any way related, the cicada has attracted the notice of the poet. The cicada of the Isles of Greece is thus addressed by the Greek Anacreon:

TO THE CICADA.

O thou, of all creation blest,
Sweet insect! that delight'st to rest
Upon the wild wood's leafy tops,
To drink the dew that morning drops,
And chirp thy song with such a glee
That happiest kings may envy thee!
Whatever decks the velvet field,
Whate'er the circling seasons yield,
Whatever buds, whatever blows,
For thee it buds, for thee it grows.
Nor art thou yet the peasant's fear,
To him thy friendly notes are dear,
For thou art mild as matin dew,
And still, when Summer's flowery hue
Begins to paint the bloomy plain,
We hear thy sweet prophetic strain;
Thy sweet prophetic strain we hear,
And bless the notes and thee revere.
The Muses love thy shrilly tone;
Apollo calls thee for his own;
'T was he who gave that voice to thee;
'T is he that tunes thy minstrelsy.
Unworn by age's dim decline,
The fadeless blooms of youth are thine.
Melodious insect! child of earth!
In wisdom mirthful, wise in mirth.
Exempt from every weak decay
That withers vulgar frames away,
With not a drop of blood to stain
The current of thy purer vein;
So blest an age is passed by thee,
Thou seem'st a little deity.

—*Transl. of Moore.*

Cicero, sĭs′e-rō, **Marcus Tullius** (106-43 B. C.), the foremost orator of Rome. He was born in Arpinum, sixty miles southwest of Rome, January 3, 106 B. C. His father, a prosperous knight, removed to Rome to give his sons an education. Cicero studied grammar, rhetoric, elocution, and history under the best instructors to be found in the city. Then, as now, the law was regarded as an avenue to political life. Cicero attached himself to a prominent jurist named Scaevola, said "to be the most eloquent of those skilled in law; the most skilled in law of the eloquent." At the age of seventeen he served in the army. Every gentleman's son was expected to acquire some knowledge of military science. Entering upon the practice of law, Cicero won a reputation by his eloquent pleas in the courts. It was necessary to remain obscure or to take sides in politics. Cicero espoused at first the cause of the democracy, as opposed to the aristocratic party. Not satisfied with removing opponents from office, party feeling ran so high that whenever a new party came into power it considered itself unsafe until it had put a

few thousand of the opposing party to death.

During the triumphs of the aristocrats under Sulla, Cicero thought it wise to go abroad and improve his mind by study and travel. On the death of Sulla he deemed it safe to return to Rome. In the year 76 he was elected to the quaestorship, and was assigned the governorship of Sicily. Little is known of his experience in this capacity, beyond the fact that he was considered honest and capable and was held in esteem by the inhabitants of this island. Service in this position entitled him to a life membership in the Senate.

Cicero now set his eye on the consulship, a position corresponding in a rude way to that of our mayor, or possibly the president of a republic. To guard the interests of the people, two consuls were elected to serve conjointly. Cicero served first as aedile, a sort of police commissioner, and then as a praetor, corresponding in a general way to a judge—both with a view to election as consul, to which honor he succeeded in the year 63 B. C. This made him the head of the general executive and administrative business of the state. Wherever he went he was preceded by attendants carrying bundles of rods as symbols of his authority. During his consulship a bankrupt rival for the position, named Catiline, organized an infamous conspiracy to overthrow the government. Cicero by his watchfulness kept track of Catiline's movements and caused him and several of his leaders to be arrested. Cicero obtained a vote of the senate authorizing him to secure the safety of the commonwealth. This vote he interpreted by causing his prisoners to be put to death in a dungeon. This execution, though done under authority, was contrary to an act providing that no citizen of Rome should be executed judicially without the right of appeal to the people in a public meeting.

In 58 B. C. a political opponent worked upon the people to secure the passage of a bill depriving Cicero of the privilege of fire and water within a radius of 400 miles from Rome. The mob pelted Cicero with mud as he passed along the streets. He withdrew to Thessalonica. His beautiful house on the Palatine Hill and a country place in the suburbs were confiscated and plundered. In 57 B. C. he was brought back to Rome by Pompey, "borne on the shoulders of all Italy," amid general rejoicing.

In 53 B. C. he was placed on the board of augurs, a sacred college of fifteen members entrusted with the duty of seeking and interpreting the omens of the gods. They also held festivals, consecrated temples, and performed other religious rites. In *Spectator,* No. 505, we find the following comment, "Can anything be more surprising than to consider Cicero, who made the greatest figure in the Senate of the Roman commonwealth, and at the same time outshines all the philosophers of antiquity, as busying himself in the college of augurs and observing with religious attention after what manner the chickens pecked the several grains of corn which were thrown to them?" In reality the augurs had considerable political power. If they feared, for instance, that an election might be adverse, they could, and not infrequently did, announce that the omens —the auspices of the gods—were not favorable for an election on that day. Other minor positions were held by Cicero. He rejoiced in the death of Caesar at the hands of conspirators, thinking that the republic might be restored.

The party of Mark Antony, however, gained the ascendency and condemned Cicero to death, 43 B. C. He might have saved his life by flying from Italy, but could not prevail upon himself to go farther than his country villa. Here hired assassins found him. His slaves tried to hurry him away to a place of concealment in a covered litter, but were overtaken. Cicero put his head out of the litter and met his fate. His head and his hands were cut off and taken to Rome where they were subjected to insult by Antony and nailed to the Rostra, the scene of many an oratorical triumph.

As a statesman Cicero was not practical. He tried to restore the days of the old republic, no longer possible. He was egotistical, but patriotic; theoretical, but sincere; vain, but not selfish. A far more

favorable impression of his daily life may be obtained from his letters than from the orations generally read in school. From these letters we may see that he was kind-hearted, generous, and affectionate. The sources of his wealth are not known, but he was famous for fine country villas, artistic furniture, a well stored library, and beautiful pieces of painting and statuary. As an orator and master of Roman prose his name stands first. Some fifty-seven of his speeches, a score of fragments, and the titles of thirty others are still extant. They were written on long rolls of parchment, no doubt. None of the originals are known. Copies of the Catilinian orations are numerous. The very oldest, that in the famous library at Milan, was made a thousand years after Cicero's death.

Cid, sĭd, **The Poem of the,** the national Spanish epic, and the most ancient epic in any of the Romance languages. This poem recounts the achievements of Rodrigo Diaz who lived 1020-1099. He won the name of Cid from the fact that in one battle five Moorish kings acknowledged him their lord and conqueror, or *El Seid,* an Arabic word meaning lord, of which Cid is the Spanish equivalent. The Spaniards gave Diaz also the title of El Cid Camppeador, or the Lord Champion, a fitting title for him who was the "dauntless champion of the Christian religion and of the old Spanish monarchy against the Moors." He spent his life in wars against his country's oppressors and his country rewarded him by making him immortal in song and story. His memory is still sacred among his fellow countrymen. *The Poem of the Cid* contains about 3,000 lines. It dates, probably, from the year 1200. It presents most vividly the manners and the spirit of the eleventh century in Spain. It is natural, full of sympathy and charm. The author, authors, or compilers of the poem are unknown. The French Corneille has made the *Cid* the subject of one of his most successful dramas. See EPIC; CORNEILLE.

Cider, a beverage made from the juice or sap of apples. Apples contain a large percentage of juice which may be pressed out by passing the apples through a cider mill. It is considered that red apples make better cider than green or yellow ones. A bushel of apples yields about a gallon of cider. Fresh cider contains yeast plants, resident perhaps on the skin of the apple, which attack the sugar of the juice at once, converting it into alcohol. For this process, known as fermentation, see article on YEAST. The longer cider stands, the more of its sugar is converted into alcohol and the sharper the cider becomes. Hard cider is simply cider in which considerable sugar has been changed into alcohol by the process of fermentation. If cider be bottled to keep yeast out, and be boiled to kill yeast within, it will keep fresh for a long time. The making of cider has been inherited from England and Normandy. In the production of cider New York, Pennsylvania, Ohio, and Indiana lead. The United States presses from 1,500,000 to 2,000,000 barrels a year, according to the apple crop. Wormy apples and fruit not salable are usually put through the cider mill after the hurry of marketing is over. A large share of American cider is converted into vinegar. Cider was formerly a more popular beverage than now. In *Snowbound* Whittier speaks twice of the cider mug:

> And, for the winter fireside meet,
> Between the andirons' straddling feet,
> The mug of cider simmered slow,
> The apples sputtered in a row,
> And, close at hand, the basket stood
> With nuts from brown October's wood.

See APPLE; YEAST.

Cigar, a cylindrical roll of tobacco for smoking. It is made of tobacco leaf divested of stems and rolled tightly in a strong leaf or wrapper. One end is pointed for lighting, the other for insertion in the mouth. A similar roll of tobacco, not pointed at the ends, is called a cheroot. Broken tobacco rolled in a piece of corn husk or rice paper is called a cigarette or little cigar. The name cigar was given originally by the Spanish to a kind of tobacco grown in Cuba. The most expensive cigars are those produced in a favored district of this island. They sell at wholesale at a dollar apiece. The leaf of the tobacco raised in Sumatra is much used for

wrappers. Cigarettes and cheap cigars are made by machinery. The more expensive are rolled by hand. The total number of cigars made in the factories of the United States in 1920 was 7,735,583,747. Cigars are extensively imported into the United States from the Philippine Islands and from Cuba, the former sending upward of 5,000,000 in 1920, and the latter about 100,000,000. Porto Rican cigars are also imported, but in somewhat smaller quantities.

Cigarette, a small roll of tobacco, covered with paper, which is used for smoking. While it is generally admitted that the use of tobacco in any form is rather harmful to the system, the cigarette habit is a dangerous one for growing boys. Poisonous properties are released in the combustion of paper and tobacco, and these prevent the natural assimilation of food. The smoking of cigarettes brings many evils, such as loss of sleep, nervousness and disorders of the throat and stomach. Tests have been made which show that boys who do not smoke cigarettes are more alert, and have better health and endurance. A strong crusade is constantly waged against the habit, its enemies calling cigarettes "coffin nails." Societies have been organized to remedy the evil. See ANTI-CIGARETTE LEAGUE.

Cimabue, chē-mä-boo′ā, **Giovanni** (1240-1302), a noted artist of Florence, Italy, called sometimes the Father of Modern Painting. In Cimabue's time art in Italy had fallen into a state of decadence, everything was mechanical and conventional. He aimed to restore classical ideals and was the first of his day to attempt to follow nature in his paintings.

Cimabue's first masters were Greeks, who had been asked to come to Florence to decorate the church of Santa Marie Novella. These masters are perhaps responsible for the fact that Cimabue's models are largely from the works of ancient Greece. His paintings are regarded as a connecting link between ancient and modern schools. He is credited with having founded the Florentine School of painting to which Michelangelo and Raphael belonged.

Of Cimabue's works little remains. Two madonnas are preserved in Florence, and other paintings may be seen in the church of St. Francis at Assisi. See GIOTTO.

Cimon, si′mon, an Athenian general of the fifth century B. C. He was the son of Miltiades, the great general who won fame at Marathon. Cimon fought against the Persian forces at Salamis. With Aristides he was in charge of a fleet sent to deliver the Greek colonies in Asia Minor from the Persian yoke. From the expedition Aristides soon returned to Greece, leaving in sole charge Cimon who distinguished himself by various achievements, the greatest of which was his encounter with the Persians at the River Eurymedon. Cimon followed the Persian fleet up this river, destroyed or captured between two and three hundred ships, and defeated the army utterly in an engagement on land. The spoil which he took was taken by him to Athens and used for the embellishment of that city. But Cimon's success aroused jealousy among other generals and various popular leaders began to fear his power. After other attempts to injure him had failed his banishment was secured by reason of the Lacedaemonians scornfully rejecting the aid sent them in accordance with Cimon's advice. He was eventually recalled but died soon after while besieging Citium in Cyprus, 449 B. C.

Cinchona, sin-kō′na, or **Chinchona,** a genus of evergreen trees. They grow chiefly on the eastern slopes of the Andes from Colombia to Brazil, at an altitude of from 5,000 to 8,000 feet. They are the sources of Peruvian or cinchona bark and of quinine. There are about forty species. About a dozen are valuable commercially. The bark is removed by the natives, and is brought in for sale in bales. The derivation of the name is interesting. A countess of Chinchona, so called from the town of that name near Madrid, Spain, was the vice-queen of Peru. In 1638 she was cured of a fever by the use of Peruvian bark. The countess advertised the curative qualities of the bark, and the botanist, Linnaeus, immortalized the countess by naming the genus chinchona. The first "h" is omitted usually. The cultivation has been encour-

aged by the British and Dutch governments. Extensive plantations exist on the mountain slopes of Jamaica, the Himalayas, Java, and Ceylon. The bark is valuable for the extract known as quinine. About 4,000,000 pounds of cinchona bark are imported by American druggists yearly. See QUININE.

Cincinnati, a city of Ohio, the metropolis of the Ohio Valley, "The Queen City." It is situated on the northern bank of the Ohio River, very near the geographical center of the Ohio Valley. The site of the city is an amphitheater of hills from two to three miles in diameter. The center of the city is about sixty-five feet above low water. Terraces of approximately one hundred feet in height succeed each other to the level of the surrounding country, which is from four to five hundred feet above the river. These terraces, interrupted by ravines in which the remnants of native forests still stand, afford one of the most beautiful residence sections in the world. Shaded dooryards command a magnificent prospect of river and valley and the Kentucky hills beyond. A public fountain, centrally situated, cast in bronze at Munich, cost $200,000.

The city extends along the bank of the river for a distance of about fourteen miles. At the business center the sloping bank is paved with cobblestones. Floating piers, or wharves, that adjust themselves to the varying stages of water, are anchored by huge cables. The most noticeable commercial features are the great warehouses for tobacco, and the scows of coal that lie at anchor. The city is also one of the greatest pig iron markets in the United States, if not in the world. Numerous lines of steamers ply up and down the river carrying an immense amount of freight. Nineteen railroads enter the city, most of them through a long ravine that finds its way out through the amphitheater to the west. The river is spanned by five bridges, including the cantilever bridge of the Baltimore & Ohio Railway and a suspension bridge leading to the Kentucky suburbs of Covington and Newport.

MANUFACTURES. In 1922 there were approximately 3,000 manufacturing establishments in Cincinnati, covering about 90 industries and capitalized at $710,000,000. In the order of their importance, the chief products of these establishments are soap and soap products, foundry and machine shop products, packing house products, clothing, and books and other printed matter. Other commodities produced here are leather goods, flour, patent medicines, boots and shoes, tobacco and cigars, electrical goods, printers' ink, machine tools, woodworking machinery and sectional office furniture.

In the matter of transportation, Cincinnati is very well favored. The city is an important railroad center; and the completion of the Fernbank Dam on the Ohio River in 1911 has served to increase river transportation greatly.

Originally the city was a center of the mound builders. Some remains of the mounds may still be seen. An Indian trail leading southward from Detroit into Kentucky crossed the river at this point. The original town was surveyed in 1788. Cincinnati owes much to the enterprise and business sagacity of German citizens, who are still a prominent element in the city. Cincinnati has one of the great music halls of the world.

The population in 1920 was 401,247, an increase of more than 37,000 in ten years, during which time the area of the city was extended from 44 to 72 square miles.

Cincinnati includes 77 parks with a combined area of about 2,661 acres in its park system. Eden Park, on Mount Adams, is the largest of these, but is rivaled by many of the others in beauty. The park system is bound together by a series of broad boulevards. Besides the parks, there are a score or more playgrounds in the city, and on the northeast is the Zoological Garden.

Cincinnati has one of the most complete systems of public education in the country. Primary schools and grammar schools are succeeded by a system of high schools, followed in turn by the University of Cincinnati, the only strictly municipal university in the United States. The university was founded on bequests made by Charles McMicken in 1858, and maintained by tax levies subsequently authorized by the

municipality, by interest from the original endowment, and by private bequests. Mr. McMicken willed for its founding a fund of $1,000,000. But about half of the estate was located in Louisiana, and that state contested the will, making it impossible to establish the university until 1870. In 1873 it was opened to students.

The university is situated in Burnet Woods Park on a campus of nearly fifty acres. It comprises the colleges of liberal arts, law, medicine, engineering, commerce, and education, school of applied arts and school of nursing and health, and a graduate school. The university had 4,292 pupils in 1922. Students who reside in the city may attend the university after paying a fee so small that it cannot be considered tuition.

In the college of engineering of the university a Bureau of City Tests was established in 1912, in connection with the engineer's office of the city Department of Public Service. In 1913, a Municipal Reference Library, with quarters in the city hall, was organized under the department of political science of the college of liberal arts. A very important and interesting feature of the university administration is the cooperative system which originated here, that alternates study at the university college of engineering with practical work in shops and manufacturing plants.

Other important educational institutions of Cincinnati are Lane Theological Seminary, St. Joseph's and St. Xavier's colleges, the Ohio Mechanic's Institute, and the Hebrew Union College. See OHIO.

Cincinnati, Society of the, an organization of the officers of the American Revolution. The suggestion came from General Knox, while the army was yet encamped upon the Hudson. The organization was perfected May 10, 1783. The members had left their home at the call of duty, so they named the society in honor of the Roman Cincinnatus, who left the plow to defend the land. All Continental officers who had served with honor and resigned after three years' service as officers, or who had been rendered supernumerary and honorably discharged, in one of the several reductions of the American army, or who had continued to the end of the war, and all French officers who had served in the coöperating army under Count d'Estaing, or auxiliary army under Count de Rochambeau, and held or attained the rank of colonel for such services, or who had commanded a French fleet or ship of war on the American coast, were entitled to become original members, and upon doing so were required to contribute a month's pay. Many of the signers of the Declaration of Independence were invited to become honorary members.

These words were used: "To perpetuate, therefore, as well the remembrance of this vast event as the mutual friendships which have been formed under the pressure of common danger, and, in many instances, cemented by the blood of the parties, the officers of the American army do hereby, in the most solemn manner, associate, constitute, and combine themselves into one Society of Friends, to endure as long as they shall endure, or any of their eldest male posterity, and in failure thereof the collateral branches who may be judged worthy of becoming its supporters and members." A constitution was adopted. Washington was the first president-general. Meetings were to be held in the several states on Independence Day, and a general encampment was to be held in May. A golden eagle fastened to a blue ribbon edged with white was chosen as a badge. The objects of the Society were to cement the Union and to provide for needy widows and children of members.

An idea got abroad, however, that the organization was political and un-American. A "howl of popular indignation" went up. To appease popular resentment Washington suggested the abandonment of the principle of heredity. The plan was recommended by the national society, but was not carried out. The society had in 1909

Cincinnatus, the hero of a patriotic legend of Rome. Born about 519 B. C. He was an upholder of the patricians in their struggles with the plebians. He cultivated a field of four acres across the Tiber from Rome. In 458 a Roman army was hemmed in a defile of Mt. Algidus. The

senate named Cincinnatus dictator and sent deputies to inform "the sole hope of the Roman people." Livy tells the story:

> This man cultivated a farm of four acres. "There, either leaning on a stake in a ditch which he was digging, or . . . ploughing, . . . being requested by the ambassadors to listen to the commands of the Senate," he was saluted Dictator of Rome. Going immediately thither, he led the citizens against their foes, and soon returned victorious. "The leaders of the enemy were led before his car; . . . his army followed, laden with spoil." Having finished his task, he resigned his dictatorship on the sixteenth day of holding it, and returned to his farm.

Cinderella, the heroine of an old fairy tale, dearly loved of little folks. The story is doubtless of eastern origin, but is found in Germany as early as the sixteenth century, and in the French of Perrault soon after, whence it probably came into the English. As commonly told this story possesses many features delightful to the mind of a child, while lacking in those distressing elements found so frequently in old time tales. Cinderella—little cinder girl—is a poor little drudge. She has a hard-hearted stepmother and two proud, selfish sisters. But she has also a fairy godmother, with a wonderful wand! Her ragged gown is changed to a party dress. A fascinating pumpkin shell coach appears, with mice for steeds, lizards for footmen, and a long-whiskered rat on the coachman's box. Cinderella's beauty and happiness at the ball are most gratifying. But the clock strikes twelve, and the gay gown changes to rags as she runs for her coach. Then comes the search for a foot that can wear the glass slipper, lost in her haste. None but Cinderella's is small enough. She weds her prince. The sisters repent and are forgiven, and all "live happy till they die." We are told that the slipper should have been of fur; that the first Englishman who translated the tale mistook the French word *vair* for *verre,* similar in form and sound. But to the English or American child, the slipper of glass only adds another charm to the tale of her who "lay among the ashes and wedded the king's son."

Cinematograph. See MOVING PICTURES.

Cinnabar, the ore of mercury. It is a red, compact, very heavy mineral, composed chiefly of mercury and sulphur. It is found in California, Mexico, Chile, Japan, Spain, and Hungary. Mercury is obtained from the ore by roasting it in a retort. The pigment vermilion, used by painters for a brilliant red, is an artificial cinnabar in the form of a bright red powder. See MERCURY.

Cinnamon, the inner bark of a small tropical tree, closely allied to sassafras, the camphor tree, and the laurel of the poets. Cinnamon is cultivated chiefly in Ceylon, though it has been introduced in the West Indies. The cinnamon of commerce is the inner bark of the smooth growing branches of the tree. Shoots of about two years' growth are cut. The outer bark is scraped away, and the inner bark is peeled off in sheets which are dried in the sun. The sheets naturally curl into quills, the smaller of which are run into the larger and tied into bundles of about ninety pounds each for shipment. Cinnamon bark has a pleasing, sweet, warm taste and a delicate fragrance. It is much used to flavor cookery. Being expensive, ground cinnamon is apt to be adulterated. Cinnamon is a well established tint of brown. The cinnamon bear, for instance, takes the name from its color. See SPICE.

Cinque (sĭnk) **Ports,** in English politics, a collective term for the Channel ports, and territory subordinate to them. The word is French meaning five. The Five Ports were Hastings, Romney, Hythe, Dover, and Sandwich. Winchelsea and Rye were added, making seven. These Channel towns formed a sort of frontier exposed to French invasion. Before the formation of a national navy these towns lay under obligation to furnish men and ships for coast defense. After the practice of building ships at national expense became established in the reign of Henry VII, the Cinque Ports were under heavy naval obligations. They bore the brunt of the destruction of the Spanish Armada. In return for their obligations they held a charter granting special authority and special privileges. The oldest charter now on record is not ancient, but it refers to

a previous charter granted by William the Conqueror. The Cinque Ports and a number of subordinate villages were placed under a warden. The ports had a parliament and courts. They were empowered to deal with murderers and felons. They disposed of wrecks and property cast ashore by the sea. They levied tolls and ruled serfs; they were exempt from certain royal taxes; their parliament had authority to levy taxes for local purposes, and in many other ways the territory of the Cinque Ports was recognized as an independent, we might say, jurisdiction. A warden is still appointed, who acts as governor of Dover Castle, but the olden time prerogatives of the Cinque Ports have nearly all passed into national hands.

Cipango, sĭ-păng′gō, in Marco Polo's *Voyages* a name given to a group of islands east of Asia, supposed to be Japan. Columbus and other navigators made diligent search for Cipango, which Marco Polo had pictured in glowing terms.

Cipher, sī′fer, a method of sending written information in disguise. Spies sending intelligence of the movement of armies, orders sent to generals or naval commanders in foreign waters, and communications between governments and their foreign representatives are usually in cipher to prevent their being understood by unauthorized persons. In the Russo-Japanese War the Russian generals sent home their reports in cipher. They were translated in the war office, then laid before the czar. When the Russian peasants were shot down in the streets of St. Petersburg the Russian minister at Washington received a telegraphic account in cipher. If countries are at peace international courtesy requires the transmission of cipher dispatches without scrutiny or delay.

One of the simplest ciphers is the use of a dictionary. Thus: "9-3-685, 9-2-7024, 9-1-2657," referring to word, column, and page of the *Century,* would be deciphered to mean "bring your gun."

If it be desired to send the following message: "Owls meet by old oak at six," it may be done in a number of ways. We may use the letters that precede the real letters, assuming that *z* precedes a, thus: "n v k r l d d s a x n k c n z j z s r h w."

The letters that follow the real letters may be used thus: "p x m t n f f u c z p m e p b l b u t j y."

The words may be spelled backward, but this cipher is too easily read: "slwo teem yb dlo kao ta xis."

It is said that time, skill, and patience, with plenty of messages at hand, enable an expert to unravel any system of cipher ever invented. In his *Gold Bug,* Edgar Allen Poe gives a most ingenious account of the unraveling of a cipher scroll left by an old pirate to indicate where his treasure lay buried.

Modern cipher is known usually as a telegraphic code. The sender and receiver agree on a set of words and meaning. Each keeps a copy. Thus *Hamstrung bolo* may mean "Elevators are heavily loaded. Sell 600,000 bushels regardless of price," *Gopher flag* may mean "The enemy are digging mines under our largest battery. We must surrender within a week." In the first message, economy may be the motive for using a code, as telegrams cost by the word. In the second, secrecy is evidently desirable. When mere economy is desired, the sender uses usually what is known as the commercial code, a standard cipher dictionary, a copy of which is kept in all large commercial establishments and at telegraph offices. The United States government uses the Western Union code for ordinary messages. A private official code is used by the Department of State for diplomatic messages. Brokerage houses use special codes or a private code.

Cipriani, Giovanni Battista (1727-85), an Italian painter, engraver and draftsman. He was born in Florence, and studied there under Gabiani and others. In 1750 he went to Rome, where he met his friend and fellow-worker, Bartolozzi, and some English artists who induced him to go to England. This he did, and remained there for the rest of his life. He was one of the original members of the Royal Academy, and played no small part in its history. He painted many mural decorations and pictures for public and private

buildings. Cipriani was a master of the art of drawing, and by his skill and excellence did much to form the style of the English mezzotint engravers of the eighteenth century. His chief work, though, was as a draftsman for Bartolozzi's engravings and mezzotints. Cipriani died at Hammersmith, and was buried in the Chelsea burying ground, where Bartolozzi erected a monument to his memory.

Circassia, a former name of a region in the northwestern part of the Caucasus, one of the great political divisions of Russia, lying between the mountains and the Black Sea. Circassia's chief interest lies in its long struggle to free itself from Russian rule, which began in 1829, when by the Peace of Adrianople the country was ceded to Russia, and which continued until 1864, when its conquest by Russia was completed. Owing to this defeat Circassia became almost depopulated. The region abounds in rich oil fields.

The early history of Circassia is obscure. Between the 10th and 13th centuries it formed a part of the empire of Georgia, but in 1424 the Circassians were an independent people, and at war with the Tartars of the Crimea. In 1705, however, the Tartars were defeated. See CAUCASIAN RACE.

Circassians, the name of a people who inhabit Circassia, and a term employed in speaking generally of the people inhabiting the region of the Caucasus, and particularly to the Adighe or Tcherkesses, the first being their own name for themselves, the second being the one given them by the Turks and Russians. There are many Circassian tribes, but the Tcherkesses are the most noteworthy, and all are more or less mixed with Tartar, Asiatic and Aryan elements. The Circassians are noted for their great physical beauty, and the Circassian girls, especially, for their good looks, which have made them favorites in the harems of Turkish rulers and men of wealth, many of them having been only too ready to exchange their poor mountain homes for the luxury of the harem. When the Russians completed their conquest more than 300,000 Caucasians left the Caucasus for various parts of Asiatic and European Turkey, and they are said to have had a share in the Bulgarian massacres. Those remaining number about 150,000, but they are said to have lost much of their racial purity. The higher classes have embraced Mohammedanism, while the lower adhere to a mixture of Christianity, Mohammedanism and ancient heathen practices.

There are several other Circassian tribes, among them the Abkhasians on the Black Sea, and the Kabardians, Shapsukhs, Abadzeh, who are more or less related, though by language rather than by race. In all of them there is a mixture of Tartar, Asiatic, Aryan, and other elements.

While Circassia is an old nation, its historic interest lies in its struggles to free itself from the rule of Russia. The conquest of the Circassians by Russia was completed in 1864, after which great numbers of them emigrated to other countries, chiefly Turkey and Arabia.

See CAUCASIAN RACE.

Circe, ser'sē, in Greek mythology, an enchantress who lived in the island Aeaea. She was the daughter of Helios, the sun-god. In his wanderings after the Trojan war Ulysses landed at the Aeaean Isle. Observing no sign of habitation, except a palace surrounded with trees in the center of the island, he sent a part of his crew under the leadership of Eurylochus to investigate. On approaching the palace the men saw lions, tigers, and wolves that seemed very tame. Not realizing that these were men transformed by the magic of Circe, who inhabited the palace, they went on and at Circe's invitation entered the palace. Eurylochus, however, was cautious and remained outside. Circe feasted her guests, then touched each with her wand, and the whole number became swine in "head, body, voice, and bristles." Their intellects, however, were as before. The horrified Eurylochus returned to Ulysses and told what had occurred. Ulysses decided to release his companions. On his way to the palace he met Mercury who gave him a sprig of moly, a plant with power to resist sorcery. Ulysses entered the palace and was feasted as his friends had been; but when Circe touched him with her wand and commanded him to

become a swine, his form did not change as she expected, but, instead, Ulysses drew his sword and rushed upon her. She fell upon her knees and begged for mercy. This was granted, but Ulysses bound the sorceress by a solemn oath to release his companions, to practice no more charms upon them, and to dismiss them from her island in safety. Circe kept her word and made her home so pleasant for her guests that they remained a full year. At their departure she gave them aid and advice.

Who knows not Circe
Daughter of the Sun, whose charmed cup
Whoever tasted lost his upright shape,
And downward fell into a grovelling swine?
—Milton.

Circle, in geometry, a plane surface bounded by a single curved line, every point of which is equally distant from a a point within called the center. Properly speaking the space, not the bounding line is the circle. The saying that one lost in a storm is likely to travel in a circle, meaning to follow a circumference, is an illustration of the difference between popular and scientific language. Naturally enough the circle, one of the fundamental as well as one of the most graceful figures, attracted the attention of the earliest mathematicians. From the Babylonians we have the division of the circumference into 360 equal parts or degrees, and these into sixty minutes each, and the minutes into sixty seconds. Euclid, the Greek mathematician who taught at Alexandria about 277 B. C., enunciated and demonstrated the theorems of the circle in a manner little improved upon in modern textbooks. The problem of squaring the circle, or of finding the dimension of a square which shall be absolutely equivalent to a given circle, has been a standing problem for centuries. It cannot be solved owing to the fact that the relation between the circumference and the diameter cannot be found exactly. The well known ratio of 3.1415926535+ cannot be brought to an end. When one assumes to prove that certain angles are equal, because they are formed by a straight line intersecting parallels, and then undertakes to prove that the lines are parallel, because the angles in question are equal, he is said to argue in a circle.

Circuit Courts. See COURTS OF LAW.

Circulation, in physiology, the passage of blood from the heart into the arteries and from them into the veins and back through the veins into the heart. The human circulatory system consists of the heart, the arteries, the capillaries, the veins, and the lymphatic system.

Complete circulation is of two parts: The blood passes from the left ventricle to the arteries of the body, then through the capillaries to the veins, and returns to the right auricle. This passage is called systemic or body circulation. Without stopping, the blood passes into the right ventricle and is forced through the pulmonary artery into the capillaries of the lungs, whence it returns through the pulmonary veins into the left auricle, and through it, into the left ventricle. The trip to the lungs and return is called the pulmonary circulation.

The vessels that carry the blood away from the heart are called arteries. Those that carry the blood to the auricles of the heart are called veins. The arteries and veins correspond very generally in number, size, and location. In a general way an artery may be said to have a corresponding vein; but the walls of the arteries are thicker, stronger, and more elastic than those of the veins. The heart forces the blood out through the ventricles with considerable pressure. Near the heart, the pressure in the arteries is about a fifth greater than atmosphere pressure, but diminishes as the blood travels from the heart.

The great artery of the systemic circulation is the aorta. It rises from the left ventricle in an arch and passes down back of the heart, through the body cavity in front of the backbone. More than thirty branches go out from the aorta to the trunk and the internal organs. At the lower end of the abdominal cavity the aorta divides into two main branches, one going to each leg. Three branches rising from the arch of the aorta carry blood to the arms, the neck, and the head. The

arteries that rise, one on each side of the windpipe, are called carotid arteries. The large vessel carrying blood from the right ventricle to the lungs is called the pulmonary artery.

The vein which carries returning blood from the legs, the internal organs, and the trunk, is called the *ascending, or inferior, vena cava.* The blood from the head, neck, and arms returns through the *descending, or superior, vena cava.* The veins corresponding to the two carotid arteries are called jugular veins. The arteries branch again and again, until they are too small to be seen without the aid of a microscope. The veins branch likewise.

The blood passes from the ends of the arteries into the veins by small blood vessels known as capillaries, which are just large enough to allow the corpuscles of the blood to pass through. The name is derived from a Latin word meaning hair, but the capillaries are very much smaller than the finest hairs. They have the thinnest of walls, and are not to exceed a microscopic fraction of an inch in length. The veins and arteries are mere carriers. They are water-tight—we may say blood-tight—but the capillaries permit the escape of oxygen, white cells, and plasma. They also allow waste matter to pass from the tissues into the blood.

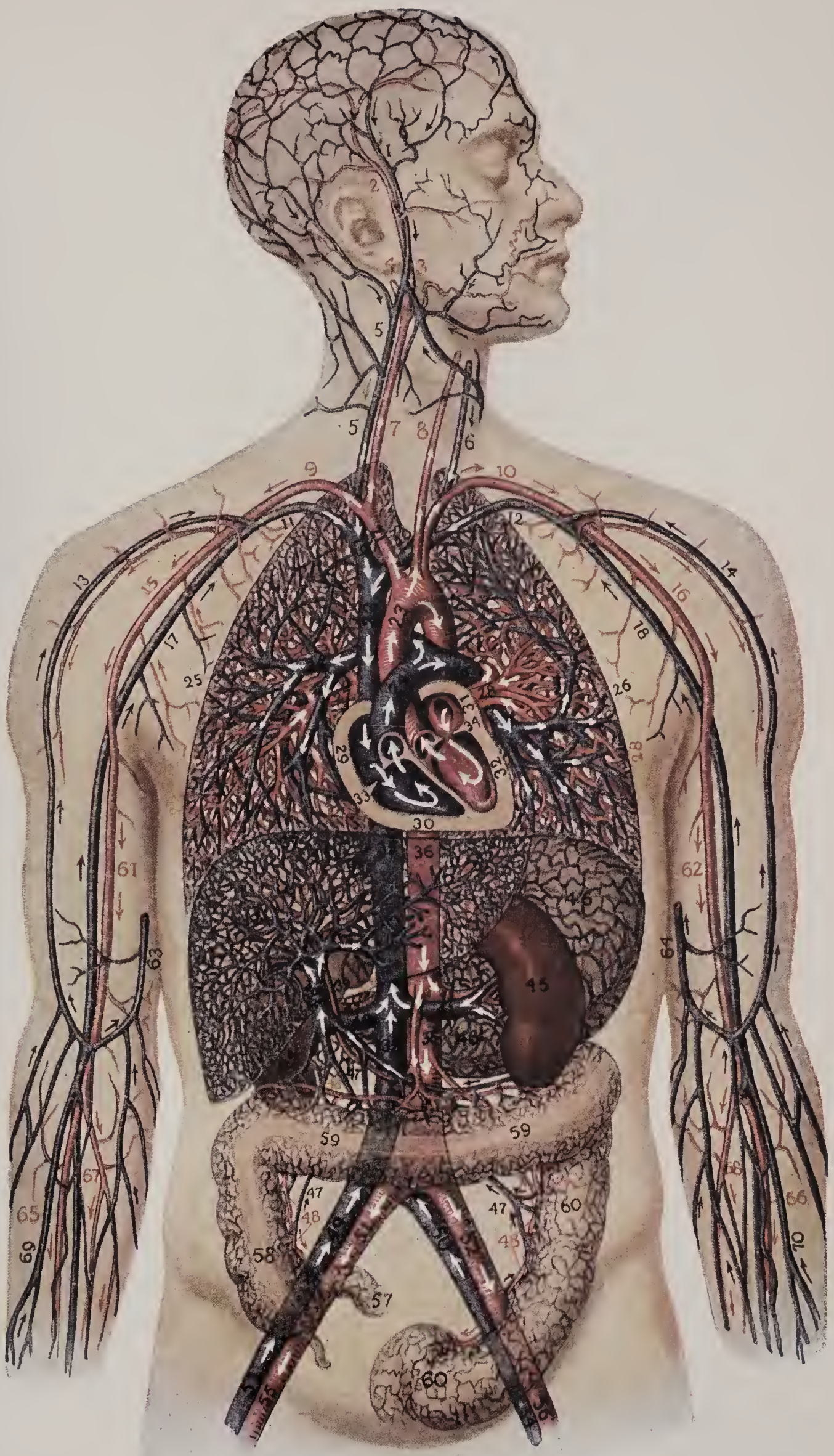
The arteries of the systemic circulation carry arterial blood—blood red with oxygen and rich with nourishment. The veins of the systemic circulation carry back dark venous blood—blood laden with carbon dioxide and the wastes of the tissues. The artery of the pulmonary system carries dark venous blood to the lungs. The four pulmonary veins bring bright arterial blood to the heart. The outgoing current of blood is driven by the muscular action of the heart. The walls of the arteries are smooth. The walls of the veins and lymphatic vessels, however, are furnished with valves which open toward the heart. The pulse of the blood in the arteries, breathing—every movement of the body that disturbs the blood or the lymph—causes these liquids to pass on toward the heart. The valves prevent a return.

There are numerous ordinarily minute crevices and cavities within the tissues, known as lymph spaces. In many parts of the body lymph capillaries form a network. The lymph vessels combine to form large ducts which empty into the veins. The largest of these is the left thoracic duct. It is about as large as a penholder. It carries lymph from the legs, the left side of the body, the neck, the head, and the arms. These lymph ducts empty into the large veins of the neck. The lymph vessels thus form a second drainage system.

The circulation of blood was not understood by the ancients. While it was known that the blood of arteries was connected with the heart, it was thought that the dark blood of the veins came from the liver, and that the two systems had no connection. Servetus, in 1553, discovered that blood passes from the heart to the body and back again; but the facts of circulation were not finally known until published by Harvey in 1628. The manner in which the blood manages to pass from the arteries to the veins was made known in 1661. The main features of the lymphatic system were made out at about the same time. As late as 1700 it was a grave question at Harvard College whether arterial blood and venous blood were the same.

The marvels of circulation are well told by Dr. Woods Hutchinson:

> In order to make this more clear, let us for a moment glance at the work of the heart. The heart is merely a hollow muscle, consisting of two pumps, one of which sends blood to the lungs, the other pumping blood through the tissues. Each side of the heart holds two ounces of blood; and as the heart contracts about 75 times a minute, this means that 150 ounces, or about 1⅛ gallons of blood passes through each side of the heart every minute. That is, about 70 gallons every hour, 1,680 gallons every day, 603,000 gallons in a year, is pumped by each of the ventricles, making the total work of the heart for the year 1,206,000 gallons. Think of the work done by the heart in ten years, in twenty, or in a lifetime! And the heart weighs about half a pound!
>
> The stream of blood leaving the heart travels 621 feet a minute, 7 miles an hour, 168 miles a day, 61,000 miles a year. No man probably has ever traveled so far as his own blood has. For the blood to make the entire double circuit from heart to lungs, then back to the heart, thence



CIRCULATION OF THE BLOOD

to the tissues, and finally back to the heart again, requires in the adult about 23 seconds.

KEY TO THE COLOR PLATE

1 R. Superficial Temporal Vein.
2 R. Superficial Temporal Artery.
3 R. External Carotid Artery.
4 R. Internal Carotid Artery.
5 R. External Jugular Vein.
6 L. External Jugular Vein.
7 R. Common Carotid Artery.
8 L. Common Carotid Artery.
9 R. Subclavian Artery.
10 L. Subclavian Artery.
11 R. Subclavian Vein.
12 L. Subclavian Vein.
13-14 R. & L. Cephalic Vein.
15-16 R. & L. Axillary Arteries.
17-18 R. & L. Axillary Veins.
19 R. Innominate Vein.
20 L. Innominate Vein.
21 R. Innominate Artery.
22 Descending Vena Cava.
23 Ascending Aorta.
24 Pulmonary Artery.
25 R. Pulmonary Artery.
26 L. Pulmonary Artery.
27 R. Pulmonary Veins.
28 L. Pulmonary Veins.
29 Heart—R. Auricle.
30 Heart—R. Ventricle.
31 Heart—L. Auricle.
32 Heart—L. Ventricle.
33 Heart—Bicuspid Valve.
34 Heart—Mitral Valve.
35 Ascending Vena Cava.
36 Descending Aorta.
37 Hepatic Veins.
38 Portal Vein.
39 Hepatic Artery.
40-41 R. & L. Renal Veins.
42-43 R. & L. Renal Arteries.
44 R. Kidney.
45 L. Kidney.
46 Stomach.
47 Mesenteric Veins.
48 Mesenteric Arteries.
49-50 R. & L. Common Iliac Veins.
51-52 R. & L. Common Iliac Arteries.
53-54 R. & L. External Iliac Veins.
55-56 R. & L. External Iliac Arteries.
57 Small Intestine.
58 Ascending Colon.
59 Transverse Colon.
60 Descending Colon.
61-62 R. & L. Brachial Arteries.
63-64 R. & L. Basilic Veins.
65-66 R. & L. Radial Arteries.
67-68 R. & L. Ulnar Arteries.
69-70 R. & L. Median Veins.

See HEART; BLOOD; LYMPH; LUNGS; OXYGEN; HARVEY.

Circus, a Roman word meaning circle. The Roman circus was an inclosed race course about five times as long as it was wide. The long sides, and one end which was semicircular in shape, were fitted up with seats rising one above another, like the benches at a ball park, sometimes to the height of three stories. The more pretentious were built of marble at an expense of millions. Pliny states that the Circus Maximus afforded seats for 260,000 spectators. Seats for the emperor and nobility were constructed under an elaborate canopy on one of the long sides. The starter's box was directly opposite. When he dropped the signal, the chariots shot forth from stalls at the square end of the circus and coursed round and round the long ellipse till the race had been decided. A stone wall along the center terminated at each end in a stone pillar which had to be rounded with care. Under Julius Caesar, a canal of water was constructed between the race course and the seats. Rowing matches and swimming contests were introduced by way of variety.

The American circus is sheltered usually under a large tent. As a rule the track is circular, and is devoted to the performances of trick horses and to circus riders. The American traveling circus was established by P. T. Barnum of Connecticut, who popularized it as the "Biggest Show on Earth," which it undoubtedly was. It included not only a circus with a thousand performing horses and a corresponding number of bareback riders, but a large number of tumblers, trapeze performers, rope walkers, a menagerie of wild animals, and an army of 1,200 workmen to erect tents and care for the property. The entire force consists of about 3,000 people. The big tent seats 25,000 spectators. There are now in America several large circuses and a score of smaller ones with regular circuits. The Forepaugh-Sells is a noted combination. Sometimes a large circus breaks up into several to tour the smaller towns. "Circus Day" is the great event in an American boy's memory.

See COLISEUM; MENAGERIE; BARNUM.

Cirrus. See CLOUD.

Cities of Refuge. According to the law of Moses, 6 out of the 48 cities which the Israelites were directed to give to the tribe of Levi in the division of the land of Canaan among the tribes, which were to be set apart as cities of refuge for the man slayer or accidental homicide. To the next of kin of the murdered man belonged the right to avenge the deed, but if the slayer fled to one of the cities designated, which were to be three on either side of Jordan, the avenger was forbidden to touch him until he stood before the congregation in judgment, when if it was found that he had acted without premeditation or malice, he had a place of residence appointed him in the city of refuge until the death of the high priest, when he was permitted to return to his own home. If the slayer violated this ruling, the avenger had the privilege of slaying him with impunity. The cities of refuge were Kedesh, Shechem, Hebron, Bezer and Golan.

Citizen. See NATURALIZATION.

Citron, a form of watermelon. The citron is nearly spherical. It has the strippings and appearance of a small watermelon, but it is nearly solid. The flesh is white, hard, and tasteless. Housewives prepare preserves from sliced citron. The flavor is much like that of preserved watermelon rind.

Citron, a sub-tropical fruit closely related to the lemon. In a broad sense, citron includes the lemon, the lime, and the citron. The term citrus fruit is still broader, including not only the fruits named, but the orange, the kumquat, and the grapefruit or pomelo, as well. The citron tree is cultivated in Greece, Italy, Sicily, Spain, and other countries for the fruit. The foliage differs from that of a lemon tree, and the fruit, though resembling a lemon, is much larger, with a thick, warty, furrowed skin. Of citrons produced in southern Europe, those from Sicily are perhaps the largest, some reaching a length of eight or nine inches and weighing several pounds. Goethe, the great German poet, celebrated his love of Italy and the bright color of the citron in his poem entitled *Mignon*:

Knows't thou the land where the citron blooms?

The thick rind of the citron is used in making preserves. Candied citron is a delicious confection. Citron culture has been introduced sparingly in California and Florida. The tree is more sensitive to frost than either the lemon or the orange. Florida nurserymen propagate the citron by budding on the rough lemon and the sour orange. Cuttings of ripe wood are used also.

City, a town of importance. Among the ancients the city was not clearly distinguished from the state, or rather the city was the state. The cities of Athens, Rome, and Carthage were states. Other cities were either independent states or subject states. According to the ancients, there could be one and only one independent city in a state. The Roman commander in Britain was a citizen, not of the Roman Empire, but of Rome.

A notion quite similar was held by the cities of the Hanseatic League and still persists in the case of the free cities of Bremen and Hamburg. They are really small republics. Bremen has 89 square miles of territory; Hamburg has 158. In English usage, a "city" was originally a cathedral town,—the seat, or "cite," of a bishop. The term was afterward extended in general use to any important town. Modern cities usually have special charters.

In the United States, it is difficult to draw the line between cities and towns or villages. The laws of some states prescribe a minimum population limit for cities of 10,000. In others, there is no limit. Under these circumstances a city may have, it may be, but a thousand, while a neighboring village may have several thousand people. A city is incorporated and is governed by a mayor and a council of aldermen. Of the twenty-seven cities having lation of more than one million are:

London (1919)	7,476,168
New York (1920)	5,620,048
Berlin (1919)	3,801,235
Paris (1921)	2,906,472
Chicago (1920)	2,701,705
Tokyo (1920)	2,173,162
Ningpo (1921)	2,172,320
Vienna (1920)	1,841,326
Philadelphia (1920)	1,823,779
Wenchow (1919)	1,738,994
Buenos Aires (1920)	1,674,000
Shanghai (1919)	1,538,500
Foochow (1919)	1,491,143
Canton (1919)	1,367,000
Peking (1921)	1,300,000
Changsha (1919)	1,271,903
Calcutta (1921)	1,263,292
Osaka (1920)	1,252,972
Budapest (1921)	1,184,616
Bombay (1921)	1,172,953
Rio de Janeiro (1920)	1,157,873
Mexico City (1910)	1,080,000
Glasgow (1921)	1,034,069
Moscow (1920)	1,028,000
Suchow (1919)	1,027,091
Chungking (1919)	1,011,597
Constantinople (1920)	1,000,000

Civet, a small flesh-eating animal intermediate between the cat and the hyena. There are several species peculiar to the Mediterranean region and Malaysia. The mongoose and the ichneumon are members of the civet family. Like its relatives the civet lives chiefly on mice and other small mammals, birds' eggs, lizards, and snakes, and assists in destroying the eggs of the

crocodile. The civet is noted for a pouch of oily fat with a peculiarly penetrating odor used as a perfume. Civets are raised for their oil, a few drops of which may be pressed out at intervals of a week or so. The Abyssinians bring civet to market in small cattle horns. Pure civet oil is worth $10 an ounce in London. See PERFUMERY.

Civil Law. See LAW.

Civil Service, the great body of clerks, secretaries, and other employes required to attend to the business of a government. The civil service does not include the military service or the naval service. In connection with the postoffices, revenue offices, courts, and custom houses, and the departments at Washington, the United States government employs approximately 700,000 persons in a civil capacity. Under the Constitution, all these are to be appointed directly by the president, except as he leaves the matter to the heads of departments. This is the theory of the Constitution. Practically, when of the same party as the president, the congressmen have claimed the privilege of making appointments in their own districts, and the president has yielded so long that the custom has acquired well nigh the force of law. When a district is represented by members of the opposite party it is customary for the president to make appointments at the suggestion of his party leader in that district. When a party goes out of power, its officeholders are likely to be dropped, and members of the successful party appointed to office. Prior to 1829, six presidents made but 112 removals from office, but rotation in office, as described, has been the prevailing method ever since the inauguration of Andrew Jackson. He stood for the principle that "to the victors belong the spoils." It is called the spoils system. It is vicious. It gives a political party a large body of party workers to labor for party success rather than for good government. It has a tendency to fill the offices with those who are active for the party, regardless of personal fitness. It induces young men to join the dominant party for the sake of office. It leads to dishonesty and scandal. This has led to various efforts at "civil service reform."

CIVIL SERVICE LAW. The Civil Service Act was passed in 1883. The purpose of the act as declared in the title is to regulate and improve the Civil Service of the United States. The law creates a Civil Service Commission of three members appointed by the President. A chief examiner, secretary and such other officials and employes as may be necessary are also provided for. The commission with the approval of the President makes such rules as are necessary for carrying the act into effect and all rules pertaining to examinations, and they are required to make an annual report upon the enforcement and effect of these rules.

Rules. The service is classified into departments, among which departmental service, customs service, postal service, internal revenue service, government printing, railway-mail, pensions, lighthouse, life-saving, insular possessions, Indian schools are the most important. Each department is also classified according to its needs and because of this system of classification the civil service has become officially known as the classified service.

The law requires all positions and all vacancies to be filled by open competitive examinations for the purpose of testing the fitness of the applicants. Vacancies are filled by selecting from among the successful candidates those having the highest grades.

Applications. Applicants must be citizens of the United States, and of the required age for the branch of the service they wish to enter. One desiring to enter the classified service must file an application blank. Blanks for the departmental service at Washington for railway-mail service, government printing service and Indian school service are procured from the Civil Service Commission at Washington, D. C. Blanks for customs, postal and internal revenue examinations should be procured from the board of civil service examiners in the city where the examination is to be held. Anyone may obtain a list of these cities by writing the Civil Service Commission at Washington. The applicant should state specifically the class of service he wishes to enter, as bookkeeper, stenographer, etc., and also state whether

or not he is willing to take a position in any of the outlying possessions of the United States.

Examinations. Two examinations are held each year, and they are open to all persons qualified to enter the class for which application is made. All directions for making applications may be procured from the commission or the local board. One desiring to enter the examination should make application several weeks in advance.

The examination is different for each class. The applicant must attain an average of 70 per cent to be eligible, except that applicants who were honorably discharged from military or naval service for disability resulting from wounds incurred in the discharge of duty are allowed to pass with a grade of 65 per cent.

Appointments. When a vacancy occurs the appointing officer makes requisition upon the Civil Service Commission for a certification of names to fill the vacancy, specifying the kind of position vacant, the sex required, and the salary. The commission sends the names of the three persons having the highest standing in the sex called for, and from these the appointing officer makes the selection. Appointments are for six months' trial. If, during that time, the person prove efficient, the position becomes permanent. In making appointments to the departmental service at Washington, apportionment of employes among the states is considered. Vacancies in the higher positions are usually filled by promotion and new employes begin the lowest grade in the class and work their way upward as promotions occur.

Exemptions. Officials appointed by the President with the advice and consent of the Senate, and private secretaries and other personal assistants to heads of departments are not under the civil service law.

Removals. No one may be removed from a civil service position except for such cause as will increase the efficiency of the public service. No person in the classified service is obliged to contribute money or service for political purposes, and all employes may vote as they choose and they have perfect freedom to express privately their political opinions, but they are forbidden to take an active part in any political campaign or to use their authority or influence to secure votes for any candidate or measure.

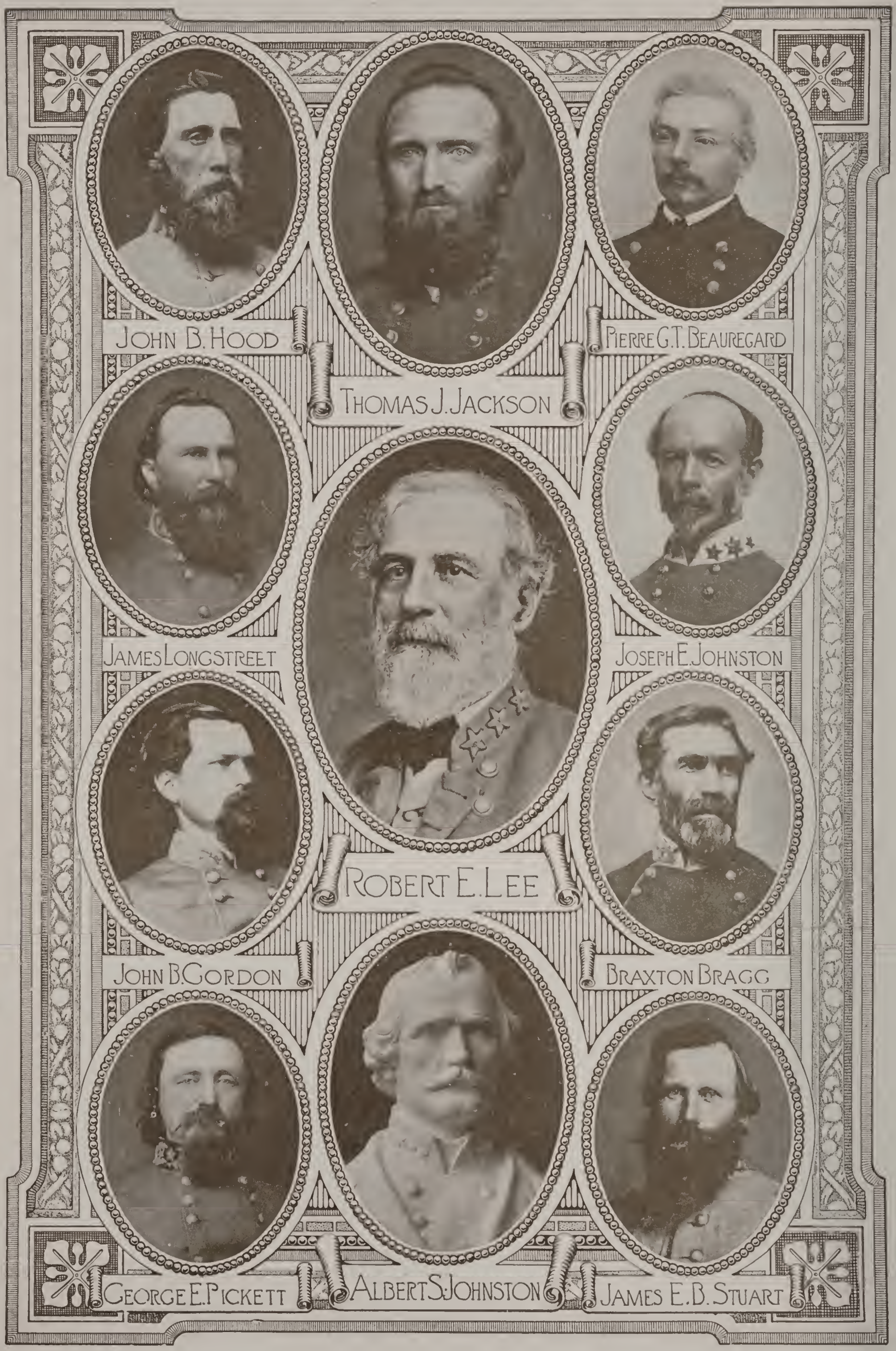
Retirement. Classified employes are automatically retired from the service unless they are certified for continuance. The retirement age varies with classes. For railway mail clerks it is 62 years, for post office clerks 65 years, and for others 70 years. Those who have served 15 years or more are entitled to an annuity based on the length of service and the average salary received during the ten years preceding retirement. The minimum annuity is $180 and the maximum $720 a year. A deduction of two and one-half per cent of each employe's salary is made to provide for this annuity. This is returned with four per cent interest to persons leaving the service before retirement.

State and City Civil Service. In most states the executive officers are elected by the people. Since each officer has authority to appoint his assistants the opportunity for applying the civil service law is not favorable. City governments, however, are better adapted to civil service rules, and many large cities have adopted a more or less complete classified service. However, since the service is created by ordinance passed by the city council, it is subject to frequent changes and rules are often set aside to make place for political favorites.

Civil Service in Canada.

Civil service in Canada is under the control of a Civil Service Commission, consisting of three commissioners and a secretary, all appointed by the Governor-General in Council. The service includes all employes of the Dominion Government except heads of departments. It is divided into two great branches—the inside and the outside service. The inside service includes the employes of the executive departments at Ottawa and the employes in a number of government offices. The outside branch includes the remainder of the service—customs officials, postoffice employes, railway employes, etc.

UNION GENERALS



CONFEDERATE GENERALS

Members of the service pay five per cent of their salaries into a return pension fund and any employe "who has served in an established capacity in the civil service for ten years or upward, and who has attained the age of sixty years or becomes incapacitated by bodily infirmity from properly performing his duties," is granted a pension by the Governor-General in Council. The amount depends upon the pensioner's average salary for the last three years and the length of service.

Civil War, The, in American history, a conflict between the northern and the southern sections of the Union. So far as open hostilities are concerned, the war may be said to have begun with the bombardment of Fort Sumter April 12, 1861, and to have closed with the surrender of the Army of West Virginia at Appomattox Court House, April 9, 1865. The eleven states of the South forming the Confederacy had a total population of 8,900,000 of whom 3,500,000 were colored slaves. The Northern, Federal, or Union area had a population of 22,100,000. The Confederacy had about 1,400,000 white men between eighteen and sixty years of age. The Union had 5,000,000 men of military age. The Confederacy enlisted and drafted 1,230,000 different men. An equivalent of 1,080,000 men were under arms for three years. The Union enlisted and drafted 2,500,000 men, and maintained a total service equivalent to 1,560,000 men for three years.

The war was confined almost entirely to the territory of the Confederacy. Slavery was abolished. The doctrine of state sovereignty was overthrown. The North increased in wealth and military strength from year to year. The Union troops laid plantations waste, ran off the stock, and devastated the most fertile valleys of the Confederacy. The South was reduced to dire poverty.

On the Union side 360,000 soldiers died on the field of battle or of disease. The Confederacy lost 258,000. It would not be far out of the way to say that the war cost 1,000,000 lives. The Union paid out $3,660,000,000, and the Confederacy spent about $1,500,000,000, gold values. All in all the conflict, counting the destruction of private property, inflicted a loss of $10,000,000,000, a loss greater than any before incurred in the world's history.

Clam, a popular name for certain bivalve mollusks. The word is akin to clamp, the two valves of the shell closing in a manner to suggest the jaws of a clamp or vise. The body is soft. The mouth parts are not developed. There is some popular confusion in the use of the term. Western people, in particular, apply the word to the mussel. Clams are found in salt water only. The most obvious difference between a clam and a mussel may be noted in the mantle. This has a thin, fleshy fringe which skirts the edge of the valves and enables the owner, at closing up time, to make a water-tight, even air-tight, joint. In case of the mussel this mantle runs clear around the edge of each valve and forms a continuous flap. The mantle of the clam is rounded out at one end of the shell into a notch, or "sinus," to permit the passage of a long "neck." When the mussel draws in and claps its valves together, nothing can be seen but shell; when the clam shuts up, a round hole at the point of the shell is filled only by the end of the soft neck. The oyster has no foot at all; that of the clam is medium.

There are two well known clams on our Atlantic coast. One is found from Cape Cod to Texas. New Yorkers call it "a clam." New Englanders, by way of distinction, call it the "round clam" for the shape of the shell, the "hard clam," for its thick, rough shell and the "little neck clam," because the neck is smaller than that of the common New England species. The Indians call it the "quahog." This clam makes shallow burrows, but it may be seen also traveling slowly like a mussel, shell half in the water and half buried in the floor of the sea. A similar species is valued for food on the coasts of France. It is a warm water clam.

The second American clam is found from New York to Greenland. New Yorkers call it the "soft clam," the "long clam," and the "long-necked clam." Yankees call it "the clam," and think there is nothing like a clambake. The long-necked clam

lives on tidal flats. With age, it sinks for protection into a permanent burrow or pocket, perhaps ten inches deep. This clam begins its burrow when young, deepens it as need arises, and stays in for a lifetime. Were he turned out in his old age he would have difficulty in making another. When the tide is in, a long "neck," containing both ends of a U-shaped tube, is thrust up to the opening of the burrow, a current of sea water is driven down one leg of the siphon, through the gills, and up the other leg of the siphon out to the sea. The gills of the clam get what air is required from this stream of water and, at the same time, strain out the minute animals and plants required for food. As is the case with all the clams, the current is propelled in part by the gills. When the tide goes out and the flat becomes bare, the clam draws down his long "neck," and closes his valves until the tide comes in again.

The New York fishermen collect clams by hand at low tide, or collect them from the bottom of the sea with a rake. The New Englander goes out on the flats at low tide and digs clams. Large and small, there are many species of clams. Nearly every coast has its clam. The so-called giant clam may be mentioned. It is a native of the seas of the East Indies. The two valves of the shell may weigh 250 pounds each. The natives of the Caroline Islands use fragments of the sharp-edged shell for axes. The body weighs some twenty pounds and is edible. Curiously enough, the scientific name of this clam, borrowed from the Greek, means three bites.

The clams of the Pacific coast are not considered equal to the "long neck" and the "little neck." Attempts have been made by the government to plant colonies of Atlantic clams on the Pacific coast.

See MUSSEL.

Clan, a tribe of related families having the same name. The word is Gaelic, signifying children, or descendants, and is expressive of a belief that all the members have a common ancestor. The term was used by the large septs into which the Irish were divided, but more particularly by the numerous families in the Cheviots and in the Highlands of Scotland. It is equivalent to the Latin or Greek *gens*.

As our account of the Scotch clans is derived largely from Lowland sources, it is not surprising that these clans are described as so many associations of thieving freebooters who raided the fertile portions of the country, carried off every article they could lay their hands on, and drove the cattle into their mountain pastures. Scott in his *Lady of the Lake* puts the case more fairly. Roderick Dhu speaks:

> These fertile fields, that softened vale,
> Were once the birthright of the Gael;
> The stranger came with iron hand,
> And from our fathers reft the land.
> . . . . . .
> Pent in this fortress of the North,
> Think'st thou we will not sally forth,
> To spoil the spoiler as we may,
> And from the robber rend the prey?
> . . . . . .
> Where live the mountain chiefs who hold,
> That plundering Lowland field and fold
> Is aught but retribution true?

The clans of the Highlands were numerous, theoretically one for each Highland name beginning in Mac, as well as many others—Clan McPherson, Clan MacDougall, Clan MacGregor, Clan Gordon, Clan Alpine, and the rest.

See CELTS; BAGPIPE; MAC; SCOTLAND.

Clarendon (1608-1674), an English earl. Under his proper name of Edward Hyde he was a member of the famous Long Parliament in which he at first supported the popular cause, but apparently becoming afraid of anarchy or of the ruin of the church, he became the leader of the royalists. On the outbreak of hostilities, he took the field for the Stuarts. When Cromwell's dragoons proved too much for the Cavaliers, Clarendon fled to the Isle of Jersey. After Cromwell's death, he arranged with General Monk for the return of Charles II to the throne. He became prime minister and was made Earl of Clarendon. His daughter became the wife of the king's brother, afterwards James II; Mary and Anne, afterwards queens of England, were granddaughters of Clarendon. Later Clarendon, himself an honest, humane man, and a supporter of constitutional government, fell into difficulties with

the licentious, corrupt, and despotic court, and was driven into exile,—a shining illustration of the ingratitude of monarchs. He wrote a "History of the Rebellion from 1641 down to the Restoration of Charles II."

Clarendon Press, the printing office of Oxford University. As early as 1586 Oxford was authorized to publish, a favor not lightly bestowed when authorities were as much afraid of a printing press as they now are of contagion. The Earl of Clarendon gave Oxford the manuscript of his *History of the Rebellion.* The sales were sufficient to defray in part the cost of a new office building, called in his honor the Clarendon. The press became famous for the printing of Bibles and prayer books, as well as for miscellaneous publications. It is now in enlarged quarters and is still one of the great publishing concerns of England. It has a royal monopoly of the right to print the King James Bible, the common version, in Great Britain. Any office may print Bibles, but no other office may print an official Bible. See OXFORD.

Clarionet, klăr′i-o-net′, a musical instrument used in orchestras and military bands. It consists of a tube enlarged to bell-shape at one end. The sound is produced by vibration of a single thin reed laid against the mouth piece, one side of which is flattened for this purpose. The tone is varied by keys along the side of the tube and by a series of holes to be stopped with the fingers.

A clarionet can be played in one key only. Different instruments are attuned, therefore, to different keys, those in the key of C and the key of F are the most popular. The clarionet was invented by Joseph Denner of Nuremberg in 1690 but has been much improved since that time.

Clarissa Harlowe. See RICHARDSON; FICTION.

Clark, Alvan (1804-1887), a maker of astronomical instruments. With his son, Alvan G. Clark (1832-1897), he formed the firm of Clark and Son of Cambridge, Massachusetts, known the world over for telescopes of great delicacy and power. The more interesting of their telescopes may be mentioned. One, bearing an object glass with an aperture or diameter of eighteen and one-half inches, is owned by the astronomical society of Chicago. The Naval Observatory at Washington has a twenty-six inch Clark telescope. Cyrus McCormick, the maker of reapers, gave a large Clark to the University of Virginia. A thirty-inch instrument was made for the Imperial Observatory at St. Petersburg; a thirty-six inch for the Lick Observatory at Mount Hamilton, California, and lastly a forty-inch object glass was ordered by C. T. Yerkes for the University of Chicago Observatory at Lake Geneva, Wisconsin.

Clark, Champ (1850-1921), an American statesman born in Anderson Co., Ky. His real name was James Beauchamp Clark. He was educated in the common schools, in Kentucky University, Bethany College, and the Cincinnati Law School. In 1873 and 1874 he acted as president of Marshall College, West Virginia, then removed to Bowling Green, Missouri, in 1880, where he afterwards lived. He took up the practice of law, and was soon elected city attorney, then county attorney, and afterward to the state legislature. In 1892 he was elected to Congress as a free-trade Democrat, and with the exception of one term has since served continuously, being chosen speaker of the House in 1911. He led on over thirty ballots for president in the Democratic National Convention of 1912.

Clark, Francis Edward (1851-), an American clergyman, was born in Aylmer, Quebec. He graduated from Dartmouth College in 1873, and continued his studies at Andover Theological Seminary. He became pastor of a Congregational Church at Portland, Me., and there organized the first Young People's Society of Christian Endeavor, February 2, 1881. He was made president of the United Society of Christian Endeavor and also became editor of the *Golden Rule,* the official organ of the society. Among his writings are: *The Story of the Y. P. S. C. E. from the Beginning and in All Lands; The Charm of Scandinavia* (with Sydney A. Clark); *Our Journey Around the World; The Great Secret; Old Lanterns for New Paths; World-Wide Christian Endeavor.*

Clark, George Rogers (1752-1818), an American soldier and pioneer. He was a native of Virginia. In 1775 he settled in Kentucky. At the outbreak of the Revolution he was a leader in the midst of the Indian warfare waged in the Ohio Valley. He defended Harrodsburg against the combined attack of British and Indians. In 1778-9 he led a force of Kentucky riflemen across the Ohio to the capture of Kaskaskia on the Mississippi. From this post he marched eastward to surprise the British at Fort Vincennes on the Wabash. This cross country march of a small force, floundering through deep snow or wading waist deep in icy water to attack a superior foe intrenched in comfort, is one of the most notable, as well as successful, expeditions on record. At the conclusion of peace it gave the United States a title to the Mississippi Valley by virtue of conquest and occupancy. In his latter days, as is too often the case, Clark's services were forgotten. He became a drunkard, fell into want, and died near Louisville in utter neglect. Good portraits are given in Churchill's *The Crossing,* Thompson's *Alice of Old Vincennes,* and Roosevelt's *Winning of the West.*

Clark, William (1770-1838), an American explorer. A brother of George Rogers Clark. He migrated from Virginia to the present site of Louisville, Kentucky. In 1808, he was appointed to the joint command of the Lewis and Clark expedition, sent by Jefferson to explore the upper waters of the Missouri, and the great Northwest. Clark's journal of the trip from St. Louis through the mountains to the mouth of the Columbia River in Oregon is full of thrilling anecdotes. It is better reading than any story of Indian adventure. He died at St. Louis. See LEWIS.

Clark University, an institution of higher learning at Worcester, Massachusetts, founded in 1887 by Jonas Gilman Clark, merchant and philanthropist; solely a graduate institution under G. Stanley Hall till 1902, when an entirely separate collegiate department was established under the presidency of Carroll D. Wright. The two distinct schools were combined in 1921 with Wallace Walter Atwood, geographer and geologist, as president and director of the then established Graduate School of Geography, with a full staff of specialists in geographical research, training for government service, commerce and education. The inauguration of the Graduate School of Geography involves the greater development of the departments of history and international relations and economics.

Courses of study are offered in 14 departments:

Ancient Languages and Literature.
Biology.
Chemistry.
Education and School Hygiene.
English Language and Literature.
Geography.
Geology.
German Language and Literature.
History and International Relations.
Mathematics.
Physics.
Political and Social Science.
Psychology.
Romance Languages and Literatures.

An endowment of approximately $4,000,000; buildings, grounds and equipment to the value of $1,000,000; a library of 102,000 volumes and a faculty of nearly 50 professors and assistants gives the student enrollment of 375 unusual facilities for individual instruction and research.

A summer school affords university training to about 200 teachers for a six weeks' term, and an extension division gives instruction in geography by correspondence.

The unique features of Clark University are the large faculty in proportion to the number of students; the international character of the student body; the prominence of the alumni in the professional world; unusual laboratory facilities in geography, physics, chemistry and psychology; exceptional library facilities, and the participation of government specialists in the instruction in geography and history.

Clarke, James Freeman (1810-1888), an American Unitarian clergyman and miscellaneous author. He was born at Hanover, New Hampshire. He was educated at Harvard University, and his first pas-

torate was at Louisville, Kentucky. In 1841 he removed to Boston and founded the *Church of the Disciples* of which he was pastor until his death. Mr. Clarke was a friend of Channing, Holmes, and Emerson, and sympathised with the views of the Transcendentalists. He was a clear thinker—a leader in literary and educational movements. His best known writings are *Ten Great Religions, Every-Day Religion, Orthodoxy, Its Truths and Errors, Christian Doctrine of Forgiveness, Essentials and Non-Essentials in Religion.* Among his others works are: *The Legend of Thomas Didymus the Jewish Skeptic; Anti-Slavery Days,* and *Sermons on the Lord's Prayer,* and articles to current mag-

Claxton, Philander Priestley (1862-), an American educator. He was born in Tennessee. After completing a course of study at the university of his native state and filling the position of superintendent of schools at Kingston, North Carolina, for a year, he studied at Johns Hopkins University and spent a year of study in Germany. He was superintendent of schools in several cities of North Carolina, and was later professor of education in the North Carolina State Normal and Industrial College. In 1911 Mr. Claxton was appointed United States Commissioner of Education, which position he held until 1921.

Clay, a kind of earth originating chiefly from the decomposition of feldspar, and consisting largely of alumina, silica, and water, together with various impurities. Clay is traditionally yellow. The term "claybank" is applied to a horse of that color, but clays are often red from infusion of iron and, indeed, may be of almost any color. A pure clay is white. The war paints of the American Indian were merely clays of various colors. Fine clay, free from sand or grit, is the potter's material out of which crockery is made, and ordinary clay is the earth used for tiles and brick. Pipe clay is a fine clay, free from iron and other impurities, suitable for fine pottery and tobacco pipes. The annual money value of clay products far exceeds the output of gold mines. Wheat and all members of the pea family, particularly the clovers, thrive in a clay soil. Some idea of the value of clay from an agricultural point of view may be had from the following statement. Estimating the yield of wheat at twenty bushels to the acre, the following table shows the number of crops of wheat for which the various elements entering into the composition of clay are sufficient:

Element.	Crops.
Potash	226
Magnesia	4164
Lime	2260
Phosphoric acid	420
Sulphuric acid	216
Nitrogen	157

Clay, Henry (April 12, 1777-June 29, 1852), an American statesman. He was a native of Virginia. His parents lived in a swampy place, such as in Virginia is called a slash. He studied law and settled in Kentucky and was sent to the state legislature. He was in public office for over forty years. During campaigns he was called the "Mill Boy of the Slashes."

Twice he sat in the legislature of Kentucky. He represented his district three times in the United States House of Representatives, and each time he was made its speaker. He was elected to the United States Senate four times. In politics he was a Whig. Three times he was the candidate of that party for the presidency. He was defeated three times at the polls. The first time, by Adams, the second, by Jackson, and the third time, by Polk. During the second of these campaigns Clay's supporters carried ash poles in memory of Ashland. Jackson men carried hickory poles in honor of Old Hickory. The Jackson men sang:

> Alas! poor Cooney Clay!
> Alas! poor Cooney Clay!
> You never can be president,
> For so the people say.

Under Madison, Clay was one of the envoys to negotiate the treaty of peace in 1814; under Adams he was secretary of state. Whether on the floor of the House or the Senate, or whether he acted in some other capacity, he led his party for forty years. His admirers called him the Great Commoner—the appellation of William Pitt. He was recognized as the peer of Daniel Webster and John C. Calhoun.

As to his position on public questions, he forced on the war of 1812; he stood for a protective tariff; he drew up the compromise tariff bill to appease Calhoun and South Carolina; he carried the Missouri Compromise; he stood the staunch friend of the South American republics in their struggles with Spain; he freed his own slaves, and he drew up the famous compromise bill of 1850, known as the Omnibus Bill, because it provided for so many different measures. The chief provisions were,—the admission of California to the Union, organization of the territories of New Mexico and Utah, abolition of the slave trade in the District of Columbia, and the fugitive slave law. He advocated the plan of purchasing all slave children and setting them free. The proposed measure would have cost but a fraction of the $10,000,000,000 actually spent and destroyed by the Civil War.

Toward the end of his career Clay became very much unsettled. He tried to compromise the difficulties between the North and South, but foresaw that the Union was drifting into peril.

Of the three great names associated, Calhoun surpassed in intellect and in the integrity of his convictions; Webster excelled in the extent of his literary acquirements and in oratory; Clay possessed in the higher degree the elements of popular leadership and personal influence. Kentucky erected a monument to his memory.

Clayton-Bulwer Treaty, a treaty concluded between the United States and Great Britain in 1850. Its purpose was to facilitate the construction of a ship canal across Central America. The negotiators, from whom the treaty takes its name, were J. Middleton Clayton, Secretary of State under President Taylor, for the United States, and Lord Henry Bulwer for Great Britain. By the terms of the treaty, the two powers guaranteed the protection and neutrality of the canal, and agreed that neither power should ever "occupy, or fortify, or colonize Nicaragua or any part of Central America." It was understood that these stipulations did not apply to British Honduras. Many disputes arose due to conflicting interpretations of the treaty and to dissatisfaction arising from changing conditions. In 1881 the claim was made by the United States that the treaty had become obsolete, but Great Britain declared it to be still in force. The statement in President McKinley's message of 1898, that the canal had become a national necessity led to the reopening of negotiations, with the result that in 1901 a new treaty was ratified, John Hay, secretary of state, and Lord Pauncefote acting as negotiators. By the Hay-Pauncefote treaty the Clayton-Bulwer treaty was abrogated. The principle of neutrality was retained, but certain rights of control not very clearly defined were granted the United States. Great Britain renounced any right to join in the construction and control of the canal but no prohibition was made concerning the erection of fortifications.

Clearing House, a central office where representatives of different banks meet to exchange checks and drafts. At the close of a day's business each bank in a city finds that it holds checks upon the other banks for various amounts. Where there are but a few banks, a clerk goes out the next morning and presents these checks, but in cities with many banks the clerks meet as stated at a given hour, usually 9 A. M. A few minutes are quite sufficient to do the work that would otherwise require travel and expenditure of valuable time. In large clearing houses a desk is provided for each bank holding membership, also a central desk for a manager. Each bank is represented by two clerks. One takes a seat at the desk, the other passes around the circle delivering the bundles of checks which he holds against the various banks. A deposit slip or statement is delivered with each bundle of checks, and a general statement is handed to the manager. If a bank receives checks in excess of its total deposits, it pays the manager the balance in cash. If a bank deposits checks exceeding in value those received, it receives the balance in cash. If the accounts be correct, the manager receives precisely as much cash as he pays out. Fines are imposed for tardiness and inaccuracy.

CLEARING HOUSE

In the New York clearing house, consisting of sixty or more members, forty-five minutes are allowed for the settlement of business that would otherwise require the time of many messengers and the transportation of enormous quantities of money with attendant risks and expenses.

The manager of the New York clearing house, stated in the *Americana* some time ago, that the daily clearings of the various cities of the United States, if made by messengers with coin, would require the transportation of 700 tons of the precious metals daily; while under the present system less than five per cent of the daily exchanges are settled in money. The system originated, it is claimed, in Edinburgh near the close of the eighteenth century. The earliest authentic records date from 1770 when the London bank clerks arranged for a meeting in an informal way at a central room to exchange deposits and pay balances. It is everywhere customary for the smaller banks, and country banks not members of the clearing house association, to make their deposits with banking members. American clearings for the year 1922 were $375,716,781,000. The Canadian clearings for the same year were $15,715,981,000.

The following table shows the volume of business done in the clearing houses of the United States and Canada:

Figures by Cities in Detail
(Three Ciphers Omitted)

	Twelve Mos. 1922	Twelve Mos. 1921
Boston	$ 16,453,000	$ 14,327,564
Providence	580,722	533,786
New Haven	291,355	274,849
Springfield, Mass.	232,505	210,452
Worcester	181,397	180,618
Portland, Me.	160,157	140,549
Fall River	95,126	79,470
Waterbury	87,495	81,292
New Bedford	79,991	74,034
Lowell	59,153	56,819
Holyoke	44,898	44,090
Total New England	$ 18,265,799	$ 16,003,523
New York	$217,900,386	$194,331,219
Philadelphia	22,490,000	20,445,000
Pittsburgh	6,864,843	6,808,206
Buffalo	2,010,651	1,811,485
Rochester	491,706	453,316
Albany	236,832	218,783
Scranton	234,317	241,512
Syracuse	218,598	201,131
Trenton	208,044	183,436
Harrisburg	201,210	202,429
Wilkes Barre	147,076	136,894
Lancaster	144,238	131,125
Reading	143,788	129,163
York	67,855	67,552
Binghamton	52,890	48,135
Total Middle	$251,412,434	$225,409,386
Detroit	$ 5,356,307	$ 4,658,780
Cleveland	4,646,443	4,666,948
Cincinnati	3,002,696	2,800,971
Louisville	1,336,371	1,199,299
Indianapolis	910,881	785,350
Columbus	731,073	660,408
Grand Rapids	314,626	294,855
Akron	303,599	326,285
Evansville	118,735	216,797
Canton	185,734	179,333
Youngstown	190,630	188,351
Gary	117,103	58,313
South Bend	109,492	96,804
Fort Wayne	101,017	92,206
Lansing	92,541	97,799
Lexington	87,579	71,723
Flint	81,841	75,383
Lima	40,268	44,204
Ann Arbor	35,824	30,120
Owensboro	23,861	22,998
Total Central Western	$ 17,786,621	$ 16,566,927
Chicago	$ 28,036,200	$ 25,974,692
Minneapolis	3,369,929	3,355,655
Omaha	1,981,529	1,903,158
Milwaukee	1,569,988	1,445,267
St. Paul	924,581	841,158
Des Moines	490,365	459,178
Duluth	320,578	334,987
Sioux City	219,854	284,872
Peoria	204,124	190,651
Lincoln	200,829	174,145
Sioux Falls	136,600	115,738
Springfield, Ill.	115,864	124,002
Cedar Rapids	108,153	105,697
Rockford	101,080	95,566
Fargo	98,640	102,431
Waterloo	68,206	69,676
Quincy	66,463	65,438
Bloomington	66,744	68,789
Aberdeen	63,794	63,019
Decatur	58,245	58,129
Grand Forks	52,200	63,889
Danville	38,938	41,975
Fremont	19,385	24,871
Jacksonville, Ill.	16,536	17,561
Total Northwestern	$ 38,328,825	$ 35,980,544

Kansas City	$ 6,811,487	$ 7,537,161
Dallas	1,419,062	1,301,333
Houston	1,243,612	1,200,771
Oklahoma	1,092,798	1,222,391
Fort Worth	577,294	612,142
Wichita	536,121	556,080
Galveston	368,288	383,317
Muskogee	303,781	161,535
Topeka	143,491	143,935
Wichita Falls	94,787	107,079
Austin	80,004	73,645
Joplin	66,213	53,859
Total Southwestern	$ 12,736,938	$ 13,353,248
Baltimore	$ 4,149,324	$ 3,745,337
New Orleans	2,405,556	2,210,182
Richmond	2,303,690	2,091,674
Atlanta	2,191,187	2,108,957
Birmingham	1,124,593	899,327
Washington	980,492	876,405
Memphis	984,068	819,009
Nashville	850,461	849,604
Jacksonville, Fla.	514,437	487,698
Little Rock	499,709	462,670
Norfolk	378,724	359,033
Wheeling	226,266	223,827
Charleston, S. C.	118,654	126,609
Knoxville	142,737	149,402
Columbia	110,450	101,532
Augusta	94,691	100,796
Mobile	91,304	83,758
Macon	65,072	63,317
Jackson, Miss.	44,709	36,706
Frederick, Md.	20,321	23,851
Vicksburg	18,166	16,506
Total Southern	$ 17,314,611	$ 15,836,200
San Francisco	$ 7,274,000	$ 6,629,000
Los Angeles	5,152,311	4,211,196
Seattle	1,658,144	1,511,603
Portland, Ore.	1,600,507	1,528,445
Denver	1,551,637	1,430,397
Oakland	680,053	543,092
Salt Lake City	671,654	661,686
Sacramento	323,673	284,417
Fresno	238,657	233,897
San Diego	176,573	136,354
Helena	168,687	163,848
Stockton	125,315	249,179
Ogden	71,334	91,739
Colorado Springs	53,841	50,096
Boise	54,429	53,695
Pueblo	40,394	41,481
Billings	30,344	38,272
Total Far-Western	$ 19,871,553	$ 17,858,397
Grand total U. S.	$375,716,781	$341,000,225
Outside New York	$157,816,395	$146,677,006
Montreal	$ 5,093,943	$ 5,720,258
Toronto	4,974,950	5,105,894
Winnipeg	2,563,939	2,682,441
Vancouver	682,964	708,206
Ottawa	370,775	404,238
Quebec	283,422	302,491
Hamilton	283,272	297,933
Calgary	335,465	335,465
Edmonton	234,211	260,288
Regina	184,949	203,659
Halifax	160,112	181,803
London	147,788	161,957
St. John	142,488	148,974
Victoria	105,776	122,416
Saskatoon	87,892	100,523
Moose Jaw	64,035	74,740
Total Canada	$ 15,715,981	$ 16,811,286

Cleburne, Texas, 54 miles southwest of Dallas, is the county seat of Johnson Co. The Texas & Brazos Valley, Missouri, Kansas & Texas, and Gulf Coast & Santa Fe railroads enter. It is situated in the center of an extensive stock raising and cotton growing territory. It contains cotton compresses, cotton seed oil mills, flour mills, a foundry, and the shops of the Gulf Coast & Santa Fe Railroad. Here also are a Carnegie library, graded schools and a fine high school. Population, 1920, 13,550.

Clematis, a genus of the buttercup family. There are over one hundred fifty species; about twenty in North America. The wild species are chiefly copsewood climbers with inconspicuous, greenish flowers and long-tailed, cottony fruit; or else they are low, erect, few-flowered herbs with bell-shaped purple sepals. The best known species is the common virgin's bower. The latter and the cultivated species are fine trellis climbers. Blue, white, purple, and rose colored, they offer fine shade and masses of rich color. See BUTTERCUP.

Clemenceau, Georges Eugène Benjamin (1841-), a noted French statesman. He studied medicine at Paris, began to practice, but was drawn into local politics. When the Franco-Prussian War came on he found himself a leader of the radical party and mayor of the Montmartre section of the city. In 1876 he became the leader of the radical Republicans in the Chamber of Deputies. Clemenceau was in position more than once to head the French

ministry, but as often refused, preferring to be on the offensive rather than the defensive. He suffered severely in reputation on account of the De Lesseps-Panama scandals, and failed of reëlection. He is known best perhaps as the editor of *La Justice*, the organ of the radical party.

In 1902 he was elected to the Senate, and in 1906 he became minister of the interior and premier of France. He was the strongest prime minister that had ever held office. In policy, he was strongly national, and opposed both to clericalism and socialism. In the "Revolt of the Midi," the wine growers of France, he put down the agitators with a strong hand; and though subjected to much criticism, he received a strong vote of confidence in the Chamber. Clemenceau is popularly known as "The Tiger." He is powerful as a debater. In June, 1917, he was again called to be premier of France and in 1918 was one of the foremost members of the Peace Conference, there justifying the appellation of tiger by the way he guarded the rights of France. On this point he has always been adamant. On the eve of the World War in 1914, speaking in the Senate, he was insistent upon steps being taken to speed the realization of the artillery program. He began to write on war long before it was declared, and some of these articles, owing to their high patriotic tone, are worthy of a place in history. Among them were the articles published in his journal *l' Homme Libre.* When the war broke out, scathing articles appeared in this journal attacking French war measures. But there was a strict censorship, and his paper was suppressed. With the decision and irony characteristic of him, he two days later published the paper with the title *l' Homme Enchaîné,* which title was kept until he himself took office on on November 16, 1917. So each day the censors had to forge new fetters to bind him. At the beginning of the war he was president of the foreign affairs committee, and he was also elected president of the army committee of the Upper Chamber.

M. Clemenceau presided at the Paris Peace Conference, and was himself the principal French delegate. In February, 1919, he was wounded by a young anarchist, Emile Cottin, but soon recovered. He was a candidate for the presidency, but withdrew in favor of M. Deschanel, and did not stand for election at the National Assembly at Versailles. At this time he retired from public life, and interested himself in traveling, visiting Egypt, India and other countries.

M. Clemenceau arrived in the United States in November, 1922, stating that his purpose in coming was to explain to Americans how a world crisis could be met and another war averted. He is a brilliant speaker, and like all gifted Frenchmen, versatile. He has written plays and novels, studies in sociology and philosophical essays. He is most witty, and his epigrams have been feared.

Clemens, Samuel Langhorne (1835-1910), an American humorist. He is known more generally as Mark Twain, a name he is said to have picked up on a Mississippi steamboat, through hearing the sounder announce the depth of the water at the bow. He was born at Florida, Missouri. His education was somewhat less than that of an ordinary district school. He learned to set type in a local town, and later worked at the printer's trade in Philadelphia, New York, and elsewhere. He took to steamboating and became a pilot. On the appointment of a brother to the secretaryship of Nevada Territory, Samuel was appointed to a clerical position. He tried his fortune in silver mining, became local editor of a newspaper in Virginia City, and later turned up in San Francisco, where he worked as a reporter. For a time he prospected in the Calaveras gold field; then worked again in San Francisco. Not satisfied with this varied experience, he went as far westward as the Sandwich Islands, and on his return took a trip to the Mediterranean regions. After editing a newspaper in Buffalo for a time, he married Olivia Langdon of Elmira, New York, and settled in Hartford, Connecticut. He died in 1910 at Reading, Connecticut.

Mr. Clemens was laid at rest in the family burial plot at Elmira beside his wife over whose remains he had previously erected a simple marble stone, bearing this epitaph:

Warm summer sun,
  Shine kindly here;
Warm southern wind,
  Blow softly here.

Green sky above,
  Lie light, lie light;
Good night, dear heart;
  Good night, good night.

Like Sir Walter Scott, Mr. Clemens had experience in publishing. In 1884 he founded the publishing firm of Charles L. Webster and Company. During the financial depression of 1894, the firm failed. This disaster swept away the author's fortune, and left him in debt to the extent of $100,000. This he paid in full and died a wealthy man.

Nearly all his books were published by subscription. Nearly 1,000,000 copies were sold in this way. Most of his works have been translated into German, French, Italian, Norwegian, Danish, and other tongues. As many copies of his books have been sold in Great Britain as in America.

Named in order of appearance, his principal works are *The Jumping Frog, The Innocents Abroad, Roughing It, Adventures of Tom Sawyer, A Tramp Abroad, Life on the Mississippi, Huckleberry Finn.* The twenty-five volume set of Mark Twain's works advertised by Harper & Brothers in 1909 includes the following titles:

The Innocents Abroad.
A Tramp Abroad.
Following the Equator.
Roughing It.
Life on the Mississippi.
The Gilded Age.
The Adventures of Tom Sawyer.
Huckleberry Finn.
Pudd'nhead Wilson.
The Prince and the Pauper.
A Connecticut Yankee in King Arthur's Court.
Joan of Arc.
Sketches New and Old.
Tom Sawyer Abroad.
American Claimant.
Literary Essays.
The Man that Corrupted Hadleyburg.
The $30,000 Bequest.
Christian Science.

Mark Twain takes high rank among American humorists. He possessed something more, too, than the ability of a mere fun-maker. He was a close observer of men and an effective interpreter of what he had observed. His writings, however, are marked by a striking inequality. "His books contain much that is flat, stale, and unprofitable," Bronson says, and this is true, though hardly more than should be anticipated from one who writes so prolifically and is always expected to create a laugh. In 1920 his name was placed in the Hall of Fame.

Mark Twain originally of Missouri, then provisionally of Hartford, and now ultimately of the Solar System, not to say the Universe.—Howells.

Time will winnow much chaff from his pages, but much of great merit will remain.—Bronson.

No American author has at his command a style more nervous, more varied, more flexible, or more direct than Mark Twain.—Brander Matthews.

Clement V, Pope from 1305-1314. At the instance of the French monarch, he suppressed the order of the Templars and removed the seat of the papacy to Avignon.

Clement XIII, Pope from 1758-1769. He supported the Jesuits against the demands of France, Spain, and Portugal for their suppression.

Clement XIV, Pope from 1769-1774. He was elected by anti-Jesuit influences and carried out the desired policy. Twenty-four thousand Jesuits and their missions all over the world were disbanded by order of Clement in 1773, nor was the order rehabilitated until 1814.

Cleopatra, kleo-pā′tra (99-30 B. C.). A queen of Egypt. The last of the Ptolemies. She was a handsome, profligate, artful woman. Many tales are told of her beauty, of her extravagance, and of her faithlessness, but none, of her good qualities. Her capital was Alexandria. Her kingdom was one of the fragments of the empire of Alexander. It lay, as she well knew, at the mercy of Rome. She murdered her husband that she might be free to intrigue. By personal influence she secured the good will of Rome during the rule of Julius Caesar, who received her at Rome with great magnificence and to whom she bore a son called Caesarion. After the assassination of Caesar, Antony—the same Mark Antony who made the celebrated speech over Caesar's dead body—visited her at Alexandria and fell

into her snares. He forsook his Roman wife and lived chiefly at Alexandria the rest of his days, heaping wealth and honors on Cleopatra. Augustus decided to dissolve partnership with Antony and to overthrow him. This he did in a naval battle at Actium, during which Cleopatra fled home with her sixty ships. Antony followed and committed suicide by falling on his sword. Cleopatra tried to make peace with Augustus as she had with Caesar and with Antony. Finding that she was making no headway, and that Augustus designed to carry her home and have her walk in his triumphal procession through the streets of Rome, she caused a slave to bring her a basket of fruit in which a poisonous asp was concealed. Preferring death to humiliation, she thrust in her bare arm, so runs the story, and received a mortal bite. Conscience she had none; but her pride was unbounded. Thus perished the last of the Ptolemies. Egypt became thenceforth a Roman province. See ANTONY; ALEXANDRIA.

If Cleopatra's death had been caused by any serpent, the small viper would rather have been chosen than the large asp; but the story is disproved by her having decked herself in "the royal ornaments," and being found dead "without any mark of suspicion of poison on her body." Death from a serpent's bite could not have been mistaken; and her vanity would not have allowed her to choose one which would have disfigured her in so frightful a manner. Other poisons are well understood and easy of access, and no boy would have ventured to carry an asp in a basket of figs, some of which he even offered to the guards as he passed; and Plutarch shows that the story of the asp was doubted. Nor is the statue carried in Augustus' triumph which had an asp upon it any proof of his belief in it, since that snake was the emblem of Egyptian royalty; the statue (or the crown) of Cleopatra could not have been without one, and this was probably the origin of the whole story.—Rawlinson.

Cleopatra's Needles, two Egyptian obelisks or monumental stones of rose red granite. They were erected originally by an Egyptian king in front of the portico of a great temple to the sun which stood on the banks of the Nile at Heliopolis, near the birthplace of Moses. Before the Christian era and during the Roman occupancy of Egypt, but not in the reign of Cleopatra, the obelisks were brought down the Nile and set up at Alexandria, where they fell over in the sand and were neglected for centuries. In 1878 one of them was brought to London and set up on the Thames embankment. The other was given a place of honor in Central Park, New York City. They are nearly of a size. Each is composed of a single block of granite. Both are four-sided and taper upward. The Central Park obelisk measures 7 feet 9¾ inches by 8 feet 2¼ inches at the base, and is 67 feet 2 inches in height. The four surfaces are inscribed with hieroglyphs cut to a depth of several inches and carefully polished. The top is a short, four-sided pyramid, on each side of which is cut a bas-relief representing the sun god of the ancient city of Heliopolis. In the rainless, warm climate of Egypt, the obelisks remained for centuries as fresh as when they first came from the quarry and chisel of the ancient Egyptians; but the rain and frost of Central Park have caused a certain amount of chipping and peeling which the authorities have tried to prevent by applying a coating of oil at frequent intervals. See CENTRAL PARK; ALEXANDRIA; OBELISK.

Clepsydra, klĕp′sĭ-drȧ, a contrivance for measuring time by the flow of water through an orifice. This is an ancient timepiece said to have been in use 2000 B. C. In its simplest form it is a hollow cylinder with an orifice in the bottom of such size that the water runs out in a certain number of hours. The descent of water in the tube or tank indicates the hour of the day or night. In its later forms it was furnished with a dial like that of a clock, the hands of which were operated by clockwork set in motion by means of weights and regulated by a float of wood or cork riding on the sinking surface of the water. Sometimes mercury was used instead of water. The clepsydra was superseded by the invention of the pendulum. See HOURGLASS; CLOCK.

Cleveland, a lake port of northern Ohio. It is situated on a level beach, on both sides of the Cuyahoga River, 115 feet above the surface of Lake Erie. The mouth of the river has been dredged and affords a

affords a capacious harbor, having several miles of wharfage. Its area is enlarged and protected by an immense outlying breakwater or dyke of masonry, constructed by the general government at an expense of $8,000,000. The valley of the river is filled with warehouses, depots, coal sheds and grimy factories. The two parts of the city that are divided by this valley were formerly crossed by only two viaducts, or elevated roadways, but three others have lately been added. The most notworthy of the five is one of the last three built—the High Level Bridge. The central span of this structure is 591 feet long and 96 feet above the water, permitting the passage beneath of the tallest masts of the lake shipping. Its total length is 5,630 feet, and its cost was $5,407,000.

The city is the metropolis of the Western Reserve. It was named for General Moses Cleaveland, its founder. It was intended originally to be the capital of a state to be called New Connecticut. It was laid out in 1796. The first library was started in 1811; the first bank in 1816; the first newspaper in 1818; in 1824 the first steamer was launched from its shipyard; in 1828 the bar was cut away from the entrance to the river; in 1851 the first railroad was built.

Cleveland is the largest city in Ohio and the fifth city in the United States. While its growth has been very rapid, it is easily accounted for. The city is the most natural outlet for the fertile country lying along this part of the lake. About fifty lines of lake steamers make the city their headquarters.

In the matter of imposing public buildings, Cleveland ranks high among American cities. Among these are the Chamber of Commerce, Public Hall, Western Reserve Historical Society building, the Federal building, court house, city hall, numerous bank buildings, and the Museum of Art, in Wade Park, a recent important addition to the city's artistic and educational interests. The monumental Union Terminal Station is to be constructed on Public Square. The Cleveland Symphony Orchestra also adds greatly to the city's artistic life. The churches are numerous and beautiful. Among the fine hotels in Cleveland are the Statler, Hollenden, Cleveland, Colonial, Olmstead, Winton and Wade Park Manor.

A reorganization of Cleveland's educational system was effected in 1917. Among the most important features of the revised system are eighteen junior high schools and the School of Education, affiliated with Western Reserve University. Besides the public schools, which are modern to the last detail, the educational institutions are Case School of Applied Science, St. Ignatius College and the Cleveland School of Art. The city's libraries are quite adequate.

Beginning in 1924, Cleveland will be governed by a commission, and will be the largest city in the United States to adopt that form of municipal government.

INDUSTRIES. More than half the pig iron produced in Cleveland is worked into finished product in the city. Cleveland outranks all other American cities in the production of steel ships, wire and wire nails, bolts and nuts, heavy machinery, malleable castings, automobile parts, and other metal articles.

Cleveland-made wires are strung around the world. Cleveland leads all other cities in the production of wire and wire nails. Its wire rods, barbed wire, piano wire, electrical wires and cables and its wire rope go into every land.

Wherever you enter a hardware store you find Cleveland-made products—wire and wire nails, fences, nuts and bolts, shears, tacks, drills, lathes, punches, shelf hardware of every kind. And in the production of vehicle hardware and of plumbers' goods the city's rank is correspondingly high. It has long been known as the "Sheffield of America."

Cleveland-made equipment for the handling of bulk freight is to be found in all the world's seaports. The large crane which is installed at League Island Navy Yard was built in Cleveland shops. The electrical magnet used in handling pig iron and other metals in bulky form is a Cleveland invention.

Cleveland is an automobile town. Cleveland makes ten automobiles of national

reputation, and leads the world in the production of automobile parts. The automobile business ranks third among the industries by which Cleveland lives, exceeded only in value of output by the iron and steel, and foundry and machine shop interests.

Cleveland was the scene of the first successful test of electric street lighting, in 1876. The use of petroleum coke, a product of Cleveland refineries as arc lamp electrodes, has led to the development of that supplemental industry, and today more than 80 per cent of the nation's electric carbons are produced here.

In Cleveland are located the headquarters, general offices, and great laboratories of the world's greatest makers of electric lights. Cleveland is, moreover, a leading producer of electric batteries, generators, fans, trucks, vacuum cleaners, and electrically-driven machinery of every kind. Population, 1920, 796,841.

Cleveland, Grover (1837-1908), the twenty-second and twenty-fourth President of the United States. He was the first Democrat elected to that office after Buchanan. He had the further distinction of being the only President who served two terms not consecutive. At the close of his first term he was defeated for re-election by Benjamin Harrison in a close contest, but four years later he was again nominated, and in turn defeated Harrison by a large majority.

Youth and Early Career. Cleveland was born March 18, 1837, at Caldwell, New Jersey, where his father was pastor of a Presbyterian church. The boy was christened Stephen Grover, but he dropped the name Stephen long before he reached manhood. When Grover was sixteen, and was just preparing to enter college, his father died, making it necessary for him to go to work to support his mother and sisters. He taught for a year in the school for the blind at Batavia, N. Y., but in the autumn of 1855 he borrowed $25.00 and set out for Cleveland, Ohio. He got as far as Buffalo, where an uncle persuaded him to settle and study law.

As did many young men of his day, Cleveland sought advancement through public office. Admitted to the bar in 1859, he took his first office in 1863 as assistant district attorney for Erie County. Two years later he was defeated for district attorney, but in 1870 he was elected sheriff. In that office he displayed on one occasion a characteristic which marked his entire public career. Repugnant though the task was, he personally sprung the trap that hanged a convicted criminal, rather than ask one of his deputies to do it. Three years in the sheriff's office were followed by an interval of private practice in law, but in 1881 he was elected mayor of Buffalo on a reform ticket. A year in that office gave him such a reputation that he was nominated and elected governor of New York by the unprecedented majority of 192,000 votes. Conscientious almost to a fault, it is said that he never signed a bill until he had read it through, and he vetoed so many bills that he was often called the veto governor. He offended many people, especially those who represented the "interests," but he was not afraid to resist popular clamor, even when by so doing he appeared to defend these same "interests." For example, he vetoed a bill to lower the rates of fare on the elevated roads in New York City, because he disapproved not the object of the bill but the method.

First Administration as President. Cleveland as governor of New York became a national figure, with the result that when the Democratic convention met in July, 1884, he was its choice for President. The Republican candidate, James G. Blaine, was one of the most brilliant men in public life. The campaign was marked by bitter charges against both candidates. When Cleveland was asked by his friends what reply they should make to the charges against him, he replied, "Tell the truth." The official count gave Cleveland a plurality of fewer than 1,500 votes in New York State and a plurality of 37 in the electoral college. The popular vote stood 4,912,696 for Cleveland to 4,849,680 for Blaine.

It was clear from the beginning of his term that Cleveland was prepared to take full responsibility for the administration. He refused to make wholesale removals of

Republican office-holders though he did dismiss enough to arouse disapproval among the ardent civil service advocates. Yet his term marked a great advance in civil service out of politics; he applied the Civil Service Act of 1883 to many offices not specifically mentioned in the act, and in all added over 11,000 offices to the classified lists. Although the Senate was Republican during the whole of this administration, a number of important laws were enacted and given the President's approval. First of these was the Interstate Commerce Act of 1887, which placed the railroads under the control of a federal commission. Other laws were the Presidential Succession Act of 1886, which provided for the ultimate succession of cabinet officers to the Presidency in the event of the vice-president's death or incapacity; the anti-Polygamy Act of 1887, dissolving the Mormon Church as a corporation and confiscating part of its property; an act forbidding further immigration of Chinese (1888); an act to establish the federal department of agriculture (1889); and an enabling act for the admission of the states of North Dakota, South Dakota, Montana and Washington (1889).

The inability of the Democratic House of Representatives and the Republican Senate to agree on the tariff brought the issue squarely before the people in the election of 1888. Cleveland was re-nominated, and was opposed by Benjamin Harrison, of Indiana, who was elected by a majority in the electoral college, although Cleveland received a slightly larger popular vote. In the election of 1892, however, the tables were turned, Cleveland being elected over Harrison. At this election, for the first time since 1860, a third candidate received electoral votes; General James B. Weaver, a Populist, had 22 votes.

Second Administration. Cleveland began his second term free from pledges of any kind; the office had sought him, not he the office. For the first time since Buchanan's administration the Democrats controlled both houses of Congress as well as the Presidency. But unfortunately Cleveland almost at once antagonized his party by his action on the silver question. In the summer of 1893 the United States suffered from a panic, followed by continued depression. Cleveland called Congress in special session, and drove through it the repeal of the Sherman Silver Purchase Act. That act by requiring the monthly purchase of 8,500,000 ounces of silver, was rapidly reducing the government's gold reserve to the danger point.

One of the principal results of the business depression was a chain of labor troubles, culminating in the Pullman strike of 1894, centering in Chicago. On his own initiative Cleveland sent troops to Chicago to protect the mails, although the governor of Illinois had declined to ask for troops and even insisted that the President had no right to send them until the governor of a state had asked for them.

In his foreign policy Cleveland was as firm as at home. His greatest act—certainly the act which left the deepest impression on American policy—was the Venezuela message, sent to Congress on December 17, 1895. The American government had urged on Great Britain the advisability of arbitrating its dispute with Venezuela over the British Guiana-Venezuela boundary, but Great Britain had replied that this matter did not concern the United States and that the Monroe Doctrine did not apply. Cleveland's course was most characteristic of him. He went on a fishing trip while the controversy was at its height, but he went so that he might get away from the turmoil and see the situation in perspective. On the evening of his return Secretary of State Olney dined with him and discussed the situation until half past ten. Then Cleveland sat down at his desk, and wrote until half past four in the morning. He immediately sent the manuscript to a stenographer, had revised it by breakfast, and at ten o'clock sent it to the Capitol. The message virtually said that if the British government refused to arbitrate, the United States would consider war necessary to enforce the Monroe Doctrine. After days of intense excitement, Great Britain agreed to arbitrate.

At the end of his term Cleveland retired to private life, making his home at Prince-

ton, New Jersey. He took an active interest in the affairs of the university there, and for the last ten years of his life was a trustee. In 1905, after the investigations in New York had shaken public confidence in the great insurance companies, he accepted a position as trustee of the Equitable Life Assurance Company, because he believed that he could help thus to re-establish public confidence. When Cleveland left the White House he might not unfairly have been called one of the most unpopular men in the country. He lived to see public opinion reversed; to see his political opponents adopt his policies as their own; and to see himself universally respected for his courage, honesty and judgment. See PRESIDENT.

Click Beetle, *(Elateridae),* so called because when on its back it is able to spring up with a click. It is also called springing beetle and skip jack. When this beetle is alarmed in any way, it will fold up its legs and feign death. If it is placed on its back it lies quietly for a while, when with a click and a jerk it will throw itself into the air, and when on its feet, will run away. The largest of this division of beetles is of a grayish-black color, with large black spots on the sides of its thorax. They live in flowers, grass and decaying wood. It is stated that in North America alone there are some 500 species of click beetles. Some of those found in the tropics are luminous, while others have glowing spots on each side of the thorax.

Cliff Dwellers, an Indian tribe formerly dwelling in the cliffs bordering the cañons of the Rio Grande and the Colorado. The dwellings were excavated in the cliffs, and consisted often of several rooms with doorways and windows having wooden sills. It is thought that the openings were closed by hangings of the skins of wild animals. The interior was neatly plastered with native clay, suitable for the purpose. Often the outer wall was built of stonework laid in clay, or of adobe. These dwellings were made usually high up in the face of a cliff, sometimes 300 feet. Many are now inaccessible, owing to the crumbling away of the ledges along which the builders made their way. As the country is quite rocky and barren, the inhabitants must have depended on the river valley for hunting and fishing. These ancient Indians understood irrigation. They raised corn, beans, watermelons, cotton, and tobacco. They domesticated the turkey. Some explorers claim to have found traces of the Andean llama. The arts of weaving and of making pottery were understood. Their weapons and tools were of bone or flint. Metals, save copper ornaments, were seemingly unknown. Judging from the ruins, some of the communities must have comprised at least 1,000 persons. One of these old strongholds contained 127 apartments. In the exploration of these ruins were found stone axes and spear heads, pieces of feathered funeral robes, sandals skillfully woven of fiber, bone needles and awls, cords made from fiber of the oose plant, but never a bit of metal of any description. Many of the walls were covered with hieroglyphics. See PUEBLOS.

Climate, the characteristic condition of a country with reference to heat, moisture, wind, and healthfulness. If a region be studied, it will be found that while the winters may differ greatly from year to year, average conditions are much the same. One day may be clear, another cloudy; yet the rainfall in the Mohawk Valley for any series of ten years is much the same. One day may be hot, the next cool; yet the average temperature of New Orleans from year to year varies little. The same is true of winds. One day may be windy, the next calm; yet a region subject to south winds will have much the same amount of south wind from year to year. The rainy winds of India do not blow from the south for a series of years, then turn around and blow from the north for a few years. Weather is very changeable; climate varies little.

Latitude is the chief factor that affects climate. Our heat is derived from the sun. The nearer the equator, the more vertical are the sun's rays. Within the tropics a bundle of rays spreads over less than half the surface that it covers within

the polar circles. The poles are about 4,000 miles farther from the sun than is the equator; but the sun is so far from the earth that this slight difference in distance has no practical effect. The coldness of the Arctic regions is due to the fact that an acre of ground receives only half as much heat as an acre in the torrid zone.

Altitude, or height above the sea level, is another important factor. The earth's atmosphere, that is to say, the air, allows the heat of the sun to pass through it freely to the earth's surface, but acts like a blanket, preventing the escape of the radiated heat; that is to say, heat coming from the sun comes through the air readily, but is so changed by radiation on turning back from the earth that it cannot escape through the air readily. The higher one ascends above the sea level the less dense the air. High plateaus and mountain ranges are colder than corresponding regions at the sea level, not because they receive less heat from the sun, but because they have a thinner air blanket with which to retain the heat. An increase of 300 feet in altitude is considered equivalent to an increase of one degree in temperature. Scientists allow a change of one degree in temperature for each 300 feet of ascent. The summits of the mountains in the Andes lying directly on the equator are covered with snow the year around, and have much the same climate as is found at the sea level in northern Greenland.

Moisture is an important factor in climate. The Pacific and Atlantic coasts of South America, particularly in the latitude of the La Plata, have a very different climate owing to a difference, chiefly, in rainfall. The prevailing winds in this belt are from the east. The coast of southern Brazil has abundant rainfall, which extends inward for a long distance. The winds are robbed of their moisture, however, by the Andes, so that the Pacific coast of northern Chile lying in sight of the ocean is practically a rainless desert, almost devoid of vegetation. Some regions have so much rain that they are swampy and unhealthful. Ocean currents modify the climate of the Pacific Coast.

Two types of climate—the continental and the oceanic—require special mention. Water heats more slowly and cools more slowly than land. Large bodies of water, therefore, prevent excessive heat in summer and excessive cold in winter. The British Isles, surrounded entirely by the ocean, have a cool summer and a warm winter. They possess an oceanic climate. The upper Mississippi Valley, on the contrary, remote from the ocean, warms up in the summer and cools off in winter. It possesses a continental climate.

Generally speaking, a region having a medium temperature with a moderate amount of rainfall, well distributed through the year, is considered to have the most desirable climate. Local pride usually comes to the defense of local climate. Most would agree, however, that central and western Europe, and portions of North America, have the most desirable climate in the world.

Climbing-Perch, a sort of spiny-rayed fish remarkable for its need of fresh air and its ability to climb. It is a native of the East Indies. During rainy weather it leaves the water and actually ascends the trunks of palm trees to a height somewhat above a man's head in search of flies and other insects. It manages to climb by means of its tail, fins, and the peculiar saw-shaped edges of its gill covers. In this manner it advances its body an inch or so at a time. The story of climbing fishes was long regarded as an invention of the oriental imagination, or of equally untrustworthy travelers; but it is now accepted by scientists. "A fish out of water" is popularly supposed to be an impossibility, or, at the most, a very uncomfortable one; but this fish seems to be an exception. Sacs of water in the sides of the head seem to supply the moisture needed by the gills. See FISH.

Clinton, De Witt (1769-1828), a governor of New York. He was a lawyer of New York City and held many important positions, including the mayoralty of the city and a seat in the United States Senate; but his chief service was an insistent, intelligent, foreseeing advocacy, in season and out of season, of the building of the

Erie Canal from Buffalo, through the Mohawk Valley, to the Hudson. The story of his struggles with prejudice, ignorance, indifference, delay, and jealousy, and his final triumphant ride in the autumn of 1825 in a barge from one end of the completed waterway to the other, reads like a romance. He died in office. The commercial supremacy and growth of New York date from the successful issue of Governor Clinton's policy. See NEW YORK; ERIE CANAL.

Clinton, George (1739-1812), an American soldier and statesman prominent during the Revolution. He was a native of New York and received a most careful education at home. He served in the French and Indian War, at the close of which he took up the study of law, soon becoming interested in politics. He was elected to the colonial assembly where he was recognized as a leader among the Whigs. In 1775 he was elected delegate to the Continental Congress, and two years later was appointed brigadier-general in the Continental Army. The same year he was elected governor of New York, and in 1804 was elected vice-president with Jefferson as President.

Clinton, Sir Henry (1738-1795), a British general in the American Revolution. He served in the Hanoverian war, and in 1775, as major-general, was sent to America, where he won distinction in the Battle of Bunker Hill. In this battle he took possession of New York after the defeat of Washington's forces in the battle of Long Island, but had to surrender Philadelphia to Washington. In 1782 he returned to England, where he died.

Clinton, the county seat of Clinton County, Iowa. It is situated on the Mississippi forty-two miles above Davenport. It is served by several railroads, and has communication by steamboat with other river towns. Bridges crossing the river at this point connect the city with Illinois. The industries include paper mills, foundries, machine and car shops, and manufacture of glucose, furniture, wire-cloth, wagons, doors, and sashes. The city has two academies and Wartburg College is located here. The population in 1920 was 24,151.

Clio, klī′o, in Greek mythology usually the muse of history. She was the daughter of Zeus and Mnemosyne, and the mother of Hyacinthus and Hymenaeus. She is usually represented in a sitting posture, her head crowned with laurel, a roll of papyrus in her hand. There is also in Greek mythology a sea-nymph, daughter of Oceanus, named Clio.

Clio, a pseudonym of Addison, formed from the various signatures "C," "L," "I," "O," used by him in *The Spectator.* The letters probably stood for Chelsea, London, Islington, and the Office, the places where the essays were composed.

Clipper, a fast sailing vessel. The clipper is to sailing vessels what the ocean greyhound is to steamships, or the race horse to cart horses. The desire for speed led to the building of slender, graceful ships of great depth, for carrying fast freight. The superiority of steamships has caused the clipper to lose its place in public importance; but in the early half of the last century the record of the fastest clipper was of as much interest as the world's record for the trotting horse. An average of fifteen miles an hour for a long voyage was considered extraordinary.

Clive, Robert (1725-1774), an English soldier. His name is connected with the conquest and occupancy of India by Great Britain. He began service in India as a clerk, but exhibited military ability during the uprisings of the natives against the East India Company. He defeated the native nabob of Bengal in the battle of Plassey, June, 1755, and was appointed governor. His administration was made the subject of a Parliamentary inquiry. It will not bear a close examination, but if the acquisition of India is to be regarded as a great event, the name of Clive must be linked in fame with that of Warren Hastings as one of the men who brought about the result. Browning's poem, *Clive,* gives a striking portrait. See INDIA; HASTINGS.

Cloaca Maxima, klō-ā′kȧ măk′sĭ-mȧ, a great stone sewer of Rome. It passes under the forum and discharges into the Tiber. It is an excellent piece of engineering, dating from the time of Augustus. It

is still in use, but is not remarkable in any way, being of interest chiefly to historians and scholars. The masonry consists of three concentric circles of hewn stones. The interior is about thirteen feet in diameter. The bodies of criminals displayed in the forum for the pleasure of the mob were usually thrown through a hole into this main sewer. A little statue near by was dedicated to Juno as the patroness of drainage purity.

Cloak, klōk, properly a loose, sleeveless outer garment worn as a protection against the weather. The name is erroneously used to designate a garment with sleeves, worn as an outer wrap by women. This garment is properly a coat. The name cloak is derived from an Anglo-Saxon word meaning bell, and was given to this garment on account of its flowing shape. The cloak was originally a garment worn by either sex. At various times, it has been an essential and picturesque part of man's attire. In the United States the cloak is now a woman's wrap; but in some countries it is still worn by men, and is a comfortable and satisfactory garment.

During the reign of Edward IV in England the cloak was the gentleman's garment. Laws were enacted to regulate its length and to designate the persons who should be allowed to wear it. During the sixteenth century the cloak came to be a garment of everyday wear. It was cut with large, loose armholes. The style is plainly shown in certain portraits of Henry VIII. A hundred years later the changing fashion of the coat caused the cloak to be done away with, except as a protection from cold and storm. The form of the cloak has changed with other fashions. At one time a half circle was the approved shape. This was called the Spanish cloak. It was trimmed with bands of fur which followed the contour of the neck, and extended down the edges of the cloak in front. In wearing, one edge was thrown across the opposite shoulder. This style of cloak is still worn in certain Italian cities.

For many years in America the shawl was the common outer garment for women. About 1810 the pelisse, a long, loose cloak with sleeves, came into fashion, and, on account of its warmth and convenience, was much in vogue. Spencer jackets, or short cloaks, were worn at various times. From 1840 to 1860, the shawl was again the popular wrap. The beginning of the modern cloak seems to have been an attempt to cut and shape the shawl into a warmer garment, and one that would allow the hands to be used while the arms remained covered.

About 1865 heavy cloaks came into fashion. Soon it was found that the former methods of home and individual manufacture were unsatisfactory, when applied to thick, heavy materials. The beginning of the trade in ready-to-wear cloaks was made by a few of the larger New York houses. A small number of cloaks were made up from the best Parisian models. So successful did this attempt prove that some firms gave up their other business entirely for cloakmaking. At first the cloaks were cut in one size only; soon in three sizes, small, large, and medium. At present many sizes are made, so that any figure may be fitted in readymade cloaks.

In the early days of cloak making a fashion was good for a whole season. The manufacturer could anticipate the trade and make up a stock beforehand. At present this is impossible, as fashions change so suddenly. The result is that cloakmaking establishments are large, employ an immense number of workers, and are managed with the best possible system, that satisfactory garments may be turned out on short notice. The successful manufacturer must have judgment and ability to foresee the public taste, that he may meet the demand without producing an over supply. The inspectors of cloth, fit, and workmanship are responsible members of the force, and good models, or "figures" to whom the garment may be fitted, are much in demand.

Clock, a machine intended to measure time by the movements of wheelwork. The chief parts of a clock are a frame or case, a train of wheels, moved by weights or a spring and regulated by the beats of a pendulum or by a balance wheel. The original meaning of the term clock is a

bell. It was applied at first only to the portion of the mechanism which struck the hours, but after a time the name was extended to the entire timepiece. The ancient term horologe, meaning literally, telling the hour, is a more appropriate term.

Mention of the clock may be found in old chronicles dating from the time of Charlemagne, and literary traces such as, "the clock struck the hour," and "the hand of the clock," may be found in the writings of the Middle Ages. It is thought that the earliest clocks were the work of the Saracens from whom the art of clock-making was learned by the monks of Europe. Many remarkable timepieces are to be found in the clock towers of European cities. A number of clocks of more or less wonderful workmanship were made for the various cathedrals of Europe during the thirteenth and fourteenth centuries.

One of these celebrated clocks is found in the south transept of Strasburg Cathedral. The original clock was built in the thirteenth century. It has been pulled down and replaced twice. The present structure contains only a few pieces and decorative paintings of the old clock. It has a number of features which never cease to attract admiring spectators. The clock consists of four stories and turrets. On the lowest level a guardian deity steps forth, one for each day in the week; Apollo, drawn in a chariot by horses, on Sunday; Diana, drawn by a stag, on Monday; on Tuesday, Mars; Wednesday, Mercury; Thursday, Jupiter; Friday, Venus; Saturday, Saturn. A wooden angel standing in the first gallery, corresponding to the lower porch of a house, strikes the quarter hours on a bell held in his hand, while a genius standing at his side, reverses a sandglass. On the next gallery a skeleton of death, surrounded by four figures representing boyhood, youth, manhood, and old age, strikes the hour with a bone. On the third gallery, at noon of each day, the twelve apostles walk around a figure of the Saviour, bowing at his feet while he makes the sign of the cross. During the procession, a wooden cock perched on one of the pinnacles flaps his wings, stretches his neck, and crows, to the great delight of little folk.

The clock tower of the English House of Parliament contains a notable modern clock. The dials are twenty-three feet in diameter, and are set one hundred eighty feet above the ground. There are three independent sets of clockwork; one turns the hands, another strikes the hours, the third plays a set of chimes. The pendulum is about thirteen feet long and weighs between six and seven hundred pounds. It takes five hours to wind up the striking parts. The large bell on which the hours are struck is called Big Ben. It weighs thirteen tons and in calm weather it can be heard all over London. This clock cost over $100,000. It is considered one of the most accurate of the large timekeepers.

In America, clock making had its beginning prior to the Revolutionary War. The first clocks were tall, eight-day pieces, driven by weights requiring to be wound up but once a week. This style, now known as the grandfather's clock, was made entirely by hand. The works lasted for many years, and were placed in cases varying in style from a rude pine box colored with cheap stain to specimens of the richest cabinet work. This is the style of clock referred to by Longfellow in his well known lines:

> And from its station in the hall
> An ancient timepiece says to all,—
> "Forever—never!
> Never—forever!"
>
> Half-way up the stairs it stands,
> And points and beckons with its hands
> From its case of massive oak,
> Like a monk, who, under his cloak,
> Crosses himself, and sighs, alas!
> With sorrowful voice to all who pass,—
> "Forever—never!
> Never—forever!"

The great height of the early clocks was necessary to allow the weights to descend, and to give room for a long pendulum to swing. With the adoption of coiled springs instead of weights, shorter clocks grew into favor, and were made smaller and smaller, until, as a matter of fact, it is now difficult to draw the line between clocks and watches. The largest clock face

in the world is said to be that mounted above the Colgate & Co. factory at Jersey City. The minute hand is twenty feet long.

Some idea of the magnitude of the clockmaking industry in the United States may be gained from the following statistics taken from the census of 1920:

Capital employed	$18,349,943
Wage earners	8,252
Annual wages	$ 7,860,000
Annual cost of material used	$ 7,178,000
Annual wholesale value of clocks	$23,380,190

The clockmaking industry of the United States is centralized largely in Connecticut. Seven extensive Connecticut factories, with one at Boston and two in the vicinity of New York City, make over one-third of the clocks produced in America.

Cloister and the Hearth, The, a historical novel by Charles Reade published in 1861. It is commonly regarded as Reade's masterpiece. The plot is laid in the fifteenth century. It presents distinct and faithful pictures of daily life in Holland, Germany, France, and Italy in medieval times. The story is intensely dramatic. The character drawing is strong. Above all, Reade has here succeeded in portraying something of the strange combination of rugged brutality with a lofty spirituality which seems to have characterized the transition period.

Cloth of Gold, a fabric of splendid appearance and great cost, much worn by the nobility during the Middle Ages. The manufacture and use are ancient. In the book of Exodus, where the vestments of the Jewish priests are described, it is said, "they did beat gold into thin plates and cut it into wires, to work it in the blue, and in the purple, and in the scarlet, and in the fine linen with cunning work." Both "wires" and flat strips of gold were used in weaving cloth of gold. It was usually combined with silk, but fabrics wholly of gold are not uncommon. It was used during the reign of Henry VIII of England.

Clothes Moth, small moths of the genus *Tinea,* the larvae of which feed on furs and woolen materials. Three different species are found in the United States, differing in habits and structure. One is a small brown moth, having darker brown spots on its fore wings; the larvae of this moth live in a case made of bits of food material bound together with silk. Another is the carpet moth; its fore wings being of a black and yellowish white tint, the head and hind wings a dark gray. The larva lives within a winding gallery composed of bits of cloth of various materials, held together with silk. A third is straw-colored, and has a naked larva that spins a little silk over its food material, but does not make either a case or a gallery.

All these varieties are destructive, and in the spring clothing liable to attack should be given a thorough brushing and beating. The garments should then be carefully packed away in bags or boxes with naptha balls, or in tarred paper, the odor of the latter being more quickly dispelled when the articles of fur or cloth are again worn. Camphor balls, freely used, are excellent as a preventive, though their odor is very offensive to some people.

Clothing, garments worn for the sake of modesty and as protection against heat and cold. Adam and Eve, typical no doubt in this respect of primitive man, "sewed fig leaves together and made themselves aprons." The customary picture of the cave man represents him girded with a short garment of skins. When first known, the Eskimo dressed wholly in skins.

The study of costumes is fascinating. No doubt leaves, skins, and matting were the first materials. Weaving was practiced at an early day. Cloth of wool, flax, silk, and cotton was known to the most ancient people of whom we have any knowledge.

The garments of the Greeks may be taken as a type of ancient dress. The principal articles of female attire were the chiton and the himation, a skirt or tunic and a plaid we should call them. The chiton or skirt was long enough to reach from the neck to the feet, and wide enough to reach from finger-tip to finger-tip with the arms outstretched. It was sleeveless at first, but in later times had sleeves to the elbow. This garment was drawn to the waist by a girdle, and was fastened together over the shoulders by

COSTUMES

1, 2. Egyptian. 3, 4. Greek. 5, 6. Roman. 7. Assyrian. 8, 9. Byzantine. 10, 11. Knights (13 Cent.). 12. French (15 Cent.). 13. Florentine (16 Cent.). 14. Venetian (16 Cent.). 15. German (16 Cent.). 16, 17. Austrian (16 Cent.). 18. French (16 Cent.). 19, 20. English (17 Cent.). 21, 22. French (17 Cent.). 23, 24. German (17 Cent.)

brooches. The lower border was ornamented with colored embroidery. This garment was of linen or silk. The himation was a long, wide, woolen plaid in a variety of colors. It was wound about the shoulders and waist variously. Sometimes a fold was thrown over the head for a head dress. Sandals, a woolen petticoat, a band about the chest, and possibly a cap with jewelry completed the costume of the Greek woman. Her husband's chief articles of dress were a pair of sandals and a large, long himation. One of the Greek tragedians represents a wife as turning the laugh on her husband by hiding his plaid and sandals, rendering it impracticable for him to go abroad that day. Ordinarily, however, men wore, in addition, a short skirt-like garment suspended from the waist. In art, Vulcan, workingmen, and helots are represented as clad in this garment only.

The Roman woman wore clothing in imitation of her Grecian cousin. In this respect, the Greek woman was the Parisian of ancient times. Roman men wore a garment corresponding to the Greek chiton. It reached from the neck to the middle of the thigh. It was known as a tunic. The himation of the Roman was an enormous affair, known as a toga. It was elliptical in shape. Its length was three times, and its breadth twice the height of the wearer. In use it was folded lengthwise, forming a semicircle about six feet wide and eighteen feet long. This clumsy garment was disposed in such a way as to drape the person from head to foot. The full toga was worn only by adults. The putting on of the boy's first toga was an occasion of family ceremony and rejoicing. Both toga and tunic were colored and ornamented, according to the rank of the wearer. Purple was reserved for royalty. The tunic may be regarded as the forerunner of the modern shirt. The toga is the ancestor of the cloak, cape, and overcoat.

It would be difficult to outline even in brief the evolution of modern clothing. The Pilgrims and other early settlers of New England and Canada did not know how to dress comfortably. The poet Whittier attributed his delicate health to colds caught in boyhood for want of warm underclothes. Comfortable underclothing is a product of the last half century.

Changes in methods of making clothing are quite as marked as changes in styles. A century ago clothing was made only when ordered. A man gave an order to his hatter, was measured by his tailor and by his shoemaker. In the course of time his new clothes were ready. People of rank had tailors in their households. The idea of keeping readymade clothing in stock is recent. It grew out of the necessity of providing clothing in advance for soldiers and sailors. The soldier of the American Revolution went to the war clad in homespun from the backs of his own sheep. Part of the destitution at Valley Forge arose from the fact that no one had thought of making up shoes and suits in quantity, from which each soldier might select what fitted him.

The earliest readymade clothing store in this country was established in 1830, it is said, at New Bedford, Massachusetts. It was patronized by sailors who begrudged the time requisite to be measured and wait for a suit to be made. The notion spread to Boston and to other points along the Atlantic. The first considerable American trade in readymade clothing was built up with the mines of California and the region of the West, where a large population preceded the tailor. In 1861 the clothing world was astounded by a contract for $1,250,000 worth of uniforms for the United States army. The manufacture of clothing is now one of the world's great industries. In the United States, counting boots and shoes, men's clothing, women's clothing, furnishing goods, furs, gloves and mittens, hats and caps, hosiery, millinery, the annual value of the clothing manufactured runs over into the billions column, and forms a good tenth of the total value of American manufactures. The percentage for Great Britain is yet larger. The chief American centers of the clothing industry are New York, Chicago, Philadelphia, Baltimore, and Boston. The volume of readymade clothing for women is increasing rapidly.

The invention of the sewing machine has proved a boon to tailors. One operative can now do the work of many former stitchers with thread and needle. Formerly the tailor measured his customer, cut the cloth, and made the suit with his own hands. Now the designer plans, the cutter piles his cloth in many layers and cuts a score of identical suits, overalls, or overcoats at once. A suit passes perhaps through the hands of a dozen operatives. Each does a certain part of the work only. Experience has taught manufacturers what sizes to make and how to meet the needs of different parts of the country.

Clotho. See FATES.

Cloud, a mass of small globules of water, or of ice and snow, suspended in the air. Clouds are formed by the evaporation of water from land and sea. There is a theory that the condensation of the water vapor, which is so fine as to be invisible, into the larger globules of visible clouds, is due not only to a cooling of the air, but, in part at least, to the presence of dust particles and the repelling and attracting influence of electricity. Scientists have found that pure, dry air may be laden with vapor and be cooled without condensation but that, if at this point in the experiment, dust be injected without a change of temperature or the addition of more vapor, a mist forms at once.

Clouds form and float at widely different heights. It is not difficult, especially when a storm is coming up, to note clouds at different altitudes moving in two or more entirely different and even opposite directions, showing that they are floating in different layers of air. The warmer the air, the more moisture it can carry. When air has all the moisture it can carry it is said to be saturated. If saturated air be warmed it can take up more moisture. If saturated air be cooled it must drop part of its moisture, and we have a shower, or a rain, or a dew.

Clouds are not merely of great benefit, but are indispensable in carrying moisture from the place of their formation to the places where moisture is needed, and where shade is welcome. Shelley expresses this thought beautifully in his *Cloud:*

I bring fresh showers for the thirsting flowers
From the seas and the streams;
I bear light shade for the leaves when laid
In their noon day dreams.
From my wings are shaken the dews that waken
The sweet buds, every one
When rocked to rest on their mother's breast,
As she dances about the sun.

Clouds are classified according to their form and height. The chief three kinds are:

1. The cirrus, a light, feathery cloud frequently seen streaming across the sky. Cirrus clouds move swiftly, and are high up, six to ten miles, in a wind-swept region.

2. The cumulus or fleecy cloud is piled up like a fleece of wool. The bases of cumulus clouds are flat and the upper parts are dome-shaped. They pile up and tumble about as if tossed by strong winds and take innumerable forms of mountains, castles, minarets, and towers.

3. The nimbus, a dark, low, rain cloud. Rents in a nimbus frequently give magnificent views of the upper regions and other clouds.

It would be a mistake to suppose that all clouds can be referred to these three forms; for clouds occur in all sorts of combinations and intermediate forms, delightful to study.

A cloud record is kept readily by a numerical scale of from 1 to 8. An entry of 0 indicates a clear sky; 8 a dark, clouded sky in which no blue can be seen, and in which the sun cannot be located.

The brilliant colors of the clouds, gray, purple, orange, yellow, olive, and pink, are due probably to the refraction of light by minute dust particles rather than to the globules of water.

The height of clouds is found by two observers located at two ends of a given base line. Each observer measures the angle formed between the base and a line directed toward a part of the cloud agreed upon. From the length of the base and the value of the two angles adjacent to the base, the altitude of the triangle, that is to say, the height of the cloud, is easily computed.

See DEW; FROST; HAIL; RAIN.

Clough, klŭf, **Arthur Hugh** (1819-1861), an English poet. He was born in

Cirrus

Cirro-stratus

Strato-cumulus

Cumulus

Cumulo-nimbus

Nimbus

CLOUDS

Liverpool. He studied at Rugby and Oxford, and was much engaged with educational work. He was a friend of Matthew Arnold who commemorated him in *Thyrsis* and *Scholar Gypsy*. Clough's most noted poem is *The Bothie of Tober-na-Vuolich*. Clough belonged to the skeptical school, of which Arnold and Swinburne are other examples. It has been said of him that "he had neither the strength to believe nor the courage to disbelieve." His poems are vigorous in tone, hopeful in spirit, and contain many noble thoughts intermingled with touches of humor and pathos.

> What voice did on my spirit fall,
> Peschiera, when thy bridge I crost?
> 'T is better to have fought and lost
> Than never to have fought at all!

As I sat at the Café I said to myself
They may talk as they please about what they call pelf,
They may sneer as they like about eating and drinking,
But help it I cannot, I cannot help thinking,
How pleasant it is to have money, heigh-ho,
How pleasant it is to have money!

Clove, the unopened flower bud of an aromatic tropical tree. The name is from the French *clou,* meaning a nail, suggested by the shape. The clove tree is an evergreen from ten to forty feet in height, native to the Molucca or Spice Islands. Its cultivation has spread to the nearer parts of southeastern Asia, to eastern Africa, to Brazil, and to the West Indies. Cloves formed an important article of caravan traffic. When the passage around the south of Good Hope was discovered, Portugal got possession of the principal clove-producing islands and held them with inhuman efforts to monopolize a money-making traffic. The cloves of commerce are the dried flower buds. The calyx is about half an inch long with a four-cleft border. The round knob in the center of the calyx is the dried corolla. If allowed to ripen, the fruit resembles an olive. *Chambers* states that the annual clove production of Zanzibar on the east coast of Africa is 2,000,000 pounds. Cloves are a favorite seasoning in cookery. A bit of clove inserted in the hollow of a troublesome tooth will frequently relieve the toothache. Oil of cloves is obtained by heating cloves in water. It is a remedy for nausea. See SPICE; MAGELLAN.

Clover, an exceedingly valuable plant of the pea family. Latin *trifolium,* three-leaved. In architecture, a trifoliate or three-leaved pattern in the tracery of a church window or other part of church architecture was regarded as particularly appropriate to the doctrine of the trinity, or three in one nature of the Godhead. There is a superstition as old as the Romans that a serpent will on no account touch a leaf of the white clover. The shamrock, the national emblem of Ireland, corresponding to the rose of England and the thistle of Scotland, is usually considered to be a clover.

There are some three hundred kinds of clovers; but farmers are interested in but three,—red, white, and alsike (pink) clover. White clover is the special delight of bees. It is valuable on worn out lands, which it has a faculty of occupying and enriching. It is not a desirable pasture plant. Red clover is one of the most valuable plants on a farm. It makes excellent pasture and fine hay. Its roots penetrating deep into the soil absorb valuable food materials from the substratum. More than this, the nodules occurring on the roots have been found to be colonies of bacteria which have the property of absorbing the free nitrogen from the air in the soil and working it over into the richest kind of plant food. Clover then not only does not draw from the soil, as corn and wheat do, but a crop of clover actually makes the soil richer. If a growing crop of clover be turned under with a plow, the soil is enriched still more. A farm is never impoverished by growing clover. There is propriety, after all, in saying of one in comfortable circumstances, "He lives in clover." An interesting and valuable fact relating to clover raising, is the relation of the bumble-bee to seed production. It is the only insect that has a proboscis adapted to reaching the deep-seated nectar cup of the red clover. In its efforts to secure this nectar it comes in contact with the pollen and thus effects the cross fertilization without which seed production is impossible.

Red clover.

Soy bean.

Roots of red clover showing nodules.

Roots of soy bean, showing nodules

CLOVER AND ITS RELATIVE, THE SOY BEAN.

Red clover will yield two crops in favorable seasons. It is considered good farming to take the first crop and plow the second under. For pasture, as well as hay, a mixture of timothy and red clover is ideal. A ton of red clover well cured contains more nourishment than an equal amount of the best timothy. Fed to cows clover hay increases the flow of milk. The states and provinces bordering on the Great Lakes are the red clover region of North America. Toledo is the greatest clover seed market. An acre produces from three to eight bushels of seed. A bushel contains from 12,000,000 to 25,000,000 seeds. From eight to fifteen pounds are required to sow an acre. A variety of red clover is known as mammoth clover.

Alsike clover is halfway in appearance and value and habits between white clover and red. Sweet clover is a fragrant, white-blossomed upright plant, allied more nearly to alfalfa.

See ALFALFA; PEA; BEAN.

Clovis (465-511), king of the Franks. His chief capital was Soissons. He married Clothilde, a Burgundian princess, who converted him from a heathen plunderer of churches into an upholder of the Church of Rome. His soldiers having borne away a vase of great size and beauty from a church, Clovis promised to restore it if it fell to him in the distribution of booty. When the booty was being distributed, Clovis asked for the vase in addition to his regular share. His soldiers could not very well refuse a request from their commander; but one rough old fellow raised his battleax and dashed the beautiful vase to fragments, crying that the king should have no more than his rightful share. Afterward, the story goes, at an inspection of his army, Clovis found fault with the condition of the armor of the soldier who had so offended, and clove him through the head. This is the tale of the vase of Soissons. Another tale runs to the effect that when hard pressed in battle with the Alemanni, Clovis made a vow that, if Clothilde's God would help him win the battle, he would desert his heathen gods for Christianity. The enemy fled; Clovis and 2,000 of his soldiers were baptized and received into the church by the Bishop of Rheims. The conversion of Clovis proved of great service to him in a political way, and brought the greater part of France under his banner. The Franks were the first important Teutonic people to adopt the orthodox form of Christianity. The other early converts (Goths, Burgundians, Lombards, and Vandals) had accepted the Arian form. The Franks afterward conquered the Burgundians, part of the Gothic kingdom, and the Lombards in Italy, and brought all these peoples into the Roman communion.

Club, an association formed usually for some social, literary, or political purpose. It is quite probable that there were clubs in Rome. Something of the sort appears to have been known among the officers of Roman garrisons stationed at a distance from the home city. London may be regarded, however, as the original home of the club. In its earliest form, the club existed in connection with some coffeehouse or tavern. Meetings were held usually in a large room of the establishment. Refreshments were served. Such organizations simply gathered around a dining table, at which the members presented themselves at a given hour, combining the taking of a regular meal with social intercourse.

In most clubs, it is understood that members are admitted by a ballot. A rejected candidate is said to have been "blackballed." Some clubs admit no visitors. The members of other clubs are permitted to invite guests. One of the earliest clubs of any note was formed in the seventeenth century at the Mermaid Tavern. Shakespeare, Beaumont, Fletcher, Sir Walter Raleigh, Donne, and Selden were members. The Kit-Cat Club of Queen Anne's reign was a Whig club. Its membership included Steele, Addison, Congreve, Robert Walpole, and many of the nobility, including the Duke of Marlborough. A rival Tory organization was known as the Beefsteak Club. The history of London clubs includes many curious names, such as the Unfortunate Club; the Lying Club, whose members were required to refrain from speaking the truth unless the president gave

express permission; the Ugly Club; the Surly Club; and the Split-farthing Club. The Literary Club, to which Dr. Samuel Johnson belonged, enrolled Sir Joshua Reynolds, Edmund Burke, Oliver Goldsmith, and Edward Gibbon. It is still in existence. As expressive of the qualities desirable in a member, Dr. Johnson coined the expression a "clubbable man."

There are now in London several scores of clubs with a total membership, possibly, of 100,000. One of the most noted is the Carleton Club, established by the Duke of Wellington. It occupies a palatial building, and is considered the headquarters of the Conservative party. It has about 1,600 members. The Reform Club is considered the headquarters of the Liberal party. Other London clubs are the Athenaeum, the Travelers, the Army and Navy, etc.

There are two or three hundred clubs in the United States. The most noted, possibly, is the Union League Club of New York. The alumni of the larger universities have established numerous clubs. A Yale club, a Harvard club, a Princeton club, etc., may be found in almost any large city. New York, however, is the club center of the United States. The Yacht Club has over 1,000 members; the Army and Navy, 1,200. The Knickerbocker Club and the Authors' Club are of a literary nature. The Press Club is composed of newspaper men. The Grolier Club encourages reprints in fine binding of rare old books. The University Club of Chicago is a notable organization, and occupies a striking building finished handsomely in oak. Nearly every city of importance in the Union has a commercial club, with a membership representing nearly every line of mental activity. Such clubs usually have commodious quarters, with conveniences for dining, and for playing games, a reading room, an assembly room, etc. Matters of importance to the city at large are taken up and discussed. Many civic reforms and enterprises are due to the various clubs of this nature. On the presentation of the regulation card, most commercial clubs extend the freedom of their quarters to the members of corresponding organizations in other cities.

Clyde, the chief river of Scotland. It rises in Lanarkshire and Dumfries, and flows westward into the Irish Sea. The river is about eighty miles in length. In its upper course it makes three distinct leaps ere it leaves the hills. The mouth is a broad estuary or firth. The channel has been dredged to permit large steamers to ascend as far as Glasgow. An outgoing steamer takes cargo at the wharves of Glasgow, but usually lies to at Greenock near the mouth of the river for passengers from the city to join it by rail. The Firth of Clyde is full of booms of timber from Norway. The lofty rock and castle of Dumbarton keep watch over a noble scene. Ships innumerable are passing up and down this busy stream. See GLASGOW.

Clytemnestra, klī-tĕm-nĕs'tra, in Greek legend, the wife of Agamemnon, king of Mycenae, and mother of Orestes. While her husband was absent at the Trojan War, Clytemnestra bestowed her favors upon Aegisthus, and the two succeeded in putting the husband to death after his return. After seven years Orestes avenged his father's death by slaying both Clytemnestra and Aegisthus. Clytemnestra was sister to Helen of Troy, and to Castor and Pollux. See AGAMEMNON; HELEN; CASTOR AND POLLUX.

Clytie, or **Clytia,** in Greek mythology, an ocean nymph. She became enamored of Helios, the sun god. Her affection was not returned and she pined away in consequence. For nine days she sat on the cold ground and mourned, but ever with her face turned toward the sun. At last the gods pitied her and allowed her to be transformed into a flower. Her feet grew downward into the ground and became roots; her body and arms became the plant, and her pretty face became a blossom, which turns always toward the sun. Thenceforth she was called the heliotrope, which means "sun-turning."

Coach. See CARRIAGE; CAR; STAGE; CAB.

Coal, a well known combustible mineral, used as a fuel. It varies in color from brown to black. It is brittle, it cannot be melted, and is not subject to decay. It is composed essentially of carbon, but con-

tains from five to six per cent of earthy matter. This is the part that is left behind in ash. Sulphur is found in almost all coal.

Coal is supposed to be derived from a vast growth of vegetation that accumulated in oceanic swamps, chiefly in a former era of rain and heat known as the carboniferous age. An intensely tropical climate caused a rank and rapid growth of tree-like rushes, now extinct, whose gigantic trunks, mingled with ferns and other plants, covered tropical areas to a great depth. A sinking of the earth's crust, followed by a deposit of soil, brought down by such floods as we have no conception of today, buried the vegetable matter of the old swamps beneath a mass of mud, a mile deep perhaps. Intense heat from the interior of the earth and pressure from above turned the plants themselves into a layer or vein of coal. Sometimes a new swamp of rank vegetation appeared above the old one; or in this way several layers of coal may have been formed, one above the other, with strata of stone intervening.

The nearest approach to coal formation nowadays are the peat beds in which vegetable fiber is accumulating from year to year. Should any considerable thickness of peat ever be covered with soil and subjected to great pressure and heat, we might expect it to become a coal measure.

Lignite is a form of coal that is but imperfectly converted. Traces of woody growth, as in the lignites of North Dakota and Texas, are still visible. Attempts to grind these coals and compress them into more solid bricks for general consumption have been made with entire success, save as to expense.

Hard coal, or anthracite, is coal that has been buried beneath great masses of earth, and hence has been subjected to such pressure and heat as to drive off the greatest possible percentage of matter that can be converted into vapors or gases, and leave a high percentage of pure carbon. The great hard coal bed of the world is that of Pennsylvania. It underlies an area 125 miles long by 35 miles wide. During the past fifty years 4,000,000,000 tons have been taken out. It is estimated that 15,000,000,000 tons remain. It will last a hundred years at the present rate of mining. About forty per cent is wasted needlessly in dust and in fragments left in the debris.

Soft coal or bituminous coal contains gaseous materials that have not been driven out. All grades of coal from soft to hard are to be found. The softer the coal, the more it swells in burning, and the denser the black smoke it gives off. The more recently coal has been formed, the softer it is likely to be.

Coal was not burned in the ancient world. We hear of the first in England about 852. American coal was mentioned by Father Hennepin who found it in the bluffs of the Illinois River near La Salle in 1673-80. It is said that the settlers of Pennsylvania did not know any use to which they could put the black stone that cropped out of the cliffs along their streams. Even after they had learned that it could be burned, and how to burn it, it was a long time before anyone thought of selling it. Each farmer drove up to a bank anywhere and shoveled in as much of the stuff as he cared to haul away. It was not until a way of getting it to Philadelphia and New York was opened up that coal began to have a money value.

At the present time the coal of the United States is spoken of as found in certain areas or districts, as the Rhode Island district; the Appalachian, extending from Pennsylvania to Alabama; the Michigan; the Illinois, including part of Indiana and Kentucky; an ill defined prairie district including localities from North Dakota to Texas; the Rocky Mountain area; and the states of the Pacific coast. Many of our coals, especially the lignites, belong to an age subsequent to that known as the carboniferous.

Although increasing quantities are produced in Nova Scotia, Vancouver Island, China, India, Australia, New Zealand, Orange Free State, and Brazil, Europe and the United States now produce practically all the coal of the world. Large fields in Alaska and adjacent parts of Canada may be expected to add to the world's output. More than half of the world's miners are

engaged in mining coal. The world's annual production of coal, according to official reports for 1922, is approximately as follows:

Total production, slightly under 1,500,000,000 short tons, of which from 550,000,000 to 650,000,000 tons are mined in the United States; 325,000,000 in Great Britain; 300,000,000 in old Germany; 66,000,000 in old Austria-Hungary; 50,000,000 in France; 40,000,000 in Russia; 25,000,000 in Belgium; 30,000,000 in Japan; 20,000,000 in China; 20,000,000 in India; 15,000,000 in Canada; 12,000,000 in New South Wales; 7,000,000 in Spain; 10,000,000 in the Union of South Africa; 2,500,000 in New Zealand, and smaller amounts in Holland, Chile, Mexico, Turkey, Italy, Sweden, Serbia, Bulgaria, Peru, and other countries.

The number of employes in the bituminous mines of the United States ranged up to 615,305 during the war year of 1918, with 243 days' work in the year, and an average digging of 3.91 tons per man per day. The number of men employed in the Pennsylvania anthracite mines has ranged in recent years between 155,000 and 180,000, averaging about 250 days' work a year, and digging from 2.02 to 2.39 tons per man per day. But for several months after the great miners' strike in 1922, in both the bituminous and the anthracite fields of the United States, mining was greatly stimulated by the urgent demand for coal, and all previous records for production and transportation of both varieties were exceeded. (The strike began on April 1, 1922, when approximately 550,000 union miners quit work, followed within the next few weeks by 90,000 men in the non-union fields of Pennsylvania and West Virginia. It lasted for five months, until the end of August, when a conference embracing coal operators and miners from all fields agreed to renew the old scales of wages which had prevailed during the war period. Thus the strike resulted in a virtual victory for the miners, who had struck against a proposed wage reduction. But they waived their demand for a six-hour day and five-day week.)

The extent of the coal reserves of the world unmined has been the subject of much interesting speculation and of more or less scientific calculation. But apprehension that the coal supply might become exhausted has been greatly lessened by the development of "white coal," or water power, for industrial use and commercial lighting and heating by electricity; for as water powers are developed factories can be run, trains moved and houses lighted and heated with a minimum use of coal, and the supply of that fuel can therefore be conserved. An estimate made in 1923 of the world's unmined coal indicates a total of 7,460,506,000,000 tons, of which 542,103,000,000 tons is anthracite. The coal unmined in Pennsylvania is estimated at 15,000,000,000 tons anthracite, as stated heretofore, and 108,474,000,000 tons bituminous; in West Virginia, 150,363,600,000 tons bituminous. The United States and Alaska possess about one-half of the world's reserve supply, or 3,538,506,328,000 tons, of which 16,153,000,000 tons are anthracite, 2,155,000,000,000 tons bituminous, and the remainder sub-bituminous and lignite. Canada ranks next, with unmined reserves of 1,361,000,000,000 tons, including 2,000,000,000 tons anthracite and 313,000,000,000 tons bituminous.

MINING. There are many methods of mining coal, as each mine presents its own problem. The selection of a method is the function of the mining engineer, and every system has for its object the extraction of the maximum amount of marketable coal from the deposit in the earth at a minimum of cost and danger to the miner. But all methods of mining coal may be broadly classed as open working or closed working. Open working is the method used when the coal deposits are not covered by a burden of rock or earth, or when the overburden is of small depth, so that it can be easily removed and leave the seams of coal exposed. The mining of such a deposit is a comparatively simple matter of excavation or quarrying, by means of steam-shovels and similar machines, employed in open pits.

Closed working, on the other hand, is the method necessarily adopted when the coal deposit lies at a considerable depth,

beneath layers of rock or earth, and the actual work of mining must be done underground. Then access must be gained to the coal seams by means of shafts, slopes or tunnels. Shafts are vertical openings dug down from the surface of the ground to the coal beneath, and are often of great depth. Through these shafts the miners descend to their work. In the United States they are usually of square or rectangular section, and lined with timber. In Europe they are often round or oval, and lined with brick, masonry or ironplate.

Coal-mine shafts are usually equipped with an elevator for hoisting out small cars that are filled with coal by the miners and returned to them empty after the contents are dumped or placed in railway cars at the surface. Generally, the shafts are divided into two or more compartments, and also supplied with ladders, pipes for conveying compressed air to the miners in the depths, etc. In large mine workings, especially where the coal is comparatively near the surface, there may be a number of shafts, each with two or three compartments, to serve different parts of the mine, so that the coal will not all have to be brought in cars to one main shaft for hoisting. Deep mines, however, are usually served by one shaft, and the various working points and levels are furnished with a system of narrow-gauge railways for transporting the coal in cars to the shaft. Mules are often employed to do the hauling of the cars underground. One of the largest coal-mine shafts in America, at Wilkesbarre, Pa., is 1,039 feet deep, 12 by 52 feet in sectional dimensions, and has five compartments. Miners are conveyed to and from their work like the coal is removed from the mine, by means of elevators, called cages, running up and down the shaft and operated by hoisting engines on the surface. Many mines use small locomotives for underground haulage of coal.

Slopes are mine openings that begin where a seam of coal crops out at the surface, and follow the seam down into the earth. They may also be equipped with hoistways, piping, etc. They are usually timber-lined. Tunnels are nearly horizontal openings which begin on the side of a mountain or hill and extend into the earth to meet the coal seam. They are usually equipped for both haulage and drainage, and resemble small railway tunnels, but are lined with timber instead of masonry.

When coal seams are reached by either of the methods mentioned, shafts, slopes or tunnels, they are worked by either the "room-and-pillar" or the "long-wall" system. In the first, or oldest method, generally used in the United States, coal is mined from a succession of small places, called rooms, chambers, stalls, boards, etc., which are dug out either squarely from or at an angle to the haulageway. In digging or blasting out the coal, pillars are left to support the roof. In the second, or long-wall method, the whole face of the coal seam is taken out, including all the coal, and the roof is allowed to settle behind the miners, but haulageways are carefully maintained through the falling earth and rock. In both methods of mining the coal is cut from the seam by hand-digging or some form of coal-cutting machines, operated by compressed air or electricity.

The ventilation of coal mines is an important matter, and in recent years has engaged the attention of the United States Bureau of Mines, which was established in 1910 and carries on mine-rescue and safety work, with experiment stations for research. Mining dangers include the presence of noxious gases peculiar to coal formations. One of the most common of these is marsh-gas, which is very explosive if mixed with the right proportions of air. This mixture is called by the coal-miner "fire-damp." Other dangerous gases found in coal mines are carbonic acid gas, sulphureted, hydrogen and carbon monoxide. These are called by miners respectively "black-damp or choke-damp," "stink-damp" and "white-damp," while "after-damp" is a very dangerous gas found after an explosion of some other gas in a mine. It has also been found by the Bureau of Mines that finely divided coal dust may cause a violent explosion. Miners therefore use safety lamps when at work, and the workings are carefully ventilated by means of mechanical fans and blowers.

Mined coal is prepared for the market by screening it over bars and through revolving or shaking screens, and breaking it with rollers to the required size. Slate or other impurities are picked out by hand, by boys or old men seated along chutes through which the coal passes on its way to the shipping bins.

Coal is utilized in many ways, most of which are familiar. Among these are (1) as a domestic fuel; (2) as a source of mechanical and electric power through the agency of steam; (3) as a reducing agent in certain chemical and metallurgical operations; (4) for the production of coke in ovens; (5) as a source of gas for illuminating and heating purposes, and of many other valuable products. It has been called "the bedrock of the art of engineering."

Coalition Cabinet, a cabinet made up from the various political parties of a country, as, in England,—Union, Liberal and Labor members. For the reason that a one party cabinet is thought to make for harmony, this form is usually preferred, though where this holds, able men are often excluded from a part in the nation's affairs. The one party form is generally used in the United States, on the belief that men holding the same political views as the President can work with him in greater harmony than men whose political views differ from his. In England, especially, the coalition principle has frequently been resorted to, as during the Great War.

Coal Tar, a thick, oily, black liquid substance obtained in the process of manufacturing illuminating gas from soft coal. It collects in the hydraulic main and condensers of the gas work; has a strong odor, and is slightly heavier than water. It is a complex mixture and the separation of its components constitutes one of the most important branches of industrial chemistry. It furnishes many products of the highest value in the arts and sciences.

The coal tar products, in fact, form a new factor in our civilized life. It was in 1856 that the first coal tar dye-stuff was discovered accidentally by a young Londoner named Perkin. He was experimenting after quinine, but on washing up his glassware after an experiment that failed, he found that the black sticky stuff in his test tube kept coloring the wash water purplish. Thus by accident he entered the field of aniline dyes and drugs, many of which are more valuable to the world than the knowledge of how to make quinine without Peruvian bark. Perkin had discovered mauve, which was the first aniline dye. Before this discovery there were only a few dyestuffs in general use, mostly barks and roots of uncertain composition. By 1914 there were 925 coal-tar dyes listed as used in the trade, and the chemist knows of thousands of others that can be made if needed. There are coal-tar dyes for all kinds of material and for any desired color and shade. Some are cheap and some are dear, some are poisonous and some harmless. They have brought more color into our clothing and into our food. Coal-tar colors to the amount of about 500,000 pounds yearly are used in the United States for coloring foods and drinks. These are constantly being tested by the United States Department of Agriculture to see that they are in themselves harmless and do not contain accidental arsenic. The favorite colors used in this field are red and yellow coal-tar dyes. The red dyes go largely into frankfurter sausages and the yellows into butter and substitute spreads, while all the colors are in demand for cake and candy, icings and ice cream, and for the wide variety of soft drinks now sold.

The English and the French at first entered into the preparation of coal-tar compounds, but were ultimately distanced by the Germans, who made the chemist an important factor in their factories and before the war of 1914 had obtained practically a world monopoly of the manufacture of coal-tar chemicals. Before the war the British were glad to sell their surplus tar at a low price to the Germans, who made out of it all sorts of dyes and drugs which they sold back to the British at high prices. The Germans also found coal-tar useful in making high explosives, but these they kept to themselves. Americans also neglected the manufacture of coal-tar prod-

ucts prior to the war, but they are now being produced very largely on this side of the Atlantic, and in 1920 the coal-tar dyes made in the United States amounted to 88,000,000 pounds, valued at $95,000,000, of which $30,000,000 worth was exported. Besides dyes, the United States manufactured in 1920 coal-tar drugs for medicinal purposes, to the amount of 5,000,000 pounds, valued at $5,700,000; and perfumes and flavors to the amount of 100,000 pounds, valued at $300,000, besides a large amount of high explosives derived from coal tar. Thus many new industries have been created out of what was long regarded as a waste product of gas works.

Coastal Plain, a strip of low-lying country along a seacoast, sloping gently toward the sea floor, of which it was once a part. A plain of this kind has its origin in a shifting of the earth's crust in such a manner that a part of the sea coast becomes exposed; sediment from the higher country inland is washed onto the plain in the natural process of erosion. The sediment accumulates on the plain, rivers channel its surface, and it becomes a fertile, well watered reach of land having the advantages secured by possession of navigable rivers and proximity to the sea.

Among the well developed coastal plains of the world is that of eastern North America, which varies much in width, and extends along the Atlantic coast to the foot hills of the Appalachian Mountains and along the Gulf of Mexico to the mouth of the Mississippi River, thence up that river to the point where the Ohio River enters; a narrower plain on the west side of the Mississippi extends southward as far as Vera Cruz, Old Mexico. The east coast of India along the Bay of Bengal is a coastal plain, as are the coastal slopes of Guiana and the plains of Patagonia, east of the Andes.

Coast and Geodetic Survey, a bureau of the United States Treasury Department. The bureau was authorized in 1807 during the presidency of Thomas Jefferson. The survey was charged with gathering and disseminating information of importance to navigation. In 1878 the scope of the bureau was enlarged to include a scientific inland survey as well. The original coast line of the United States has been increased by the acquisition of Alaska and island possessions, until the total, measuring the general trend only, is upward of 25,000 miles. The actual shore line, including harbors and inlets, is several times as great.

In the earlier stages of the survey, the work was divided between officers of the army and the navy, but the organization is now independent. A head office is maintained in Washington, with sub-offices in San Francisco, Seattle, Honolulu, and Manila. The field force consists of about seventy-five experts. The office at Washington includes about 150 clerks, engravers, draftsmen, instrument makers, printers, and minor employes. The survey owns a dozen steamers, several schooners, and a large number of launches.

A system of triangles has been surveyed along the coast from Maine to the Gulf. A second chain of triangles is under survey, following the 98th meridian from North Dakota to Mexico. Still a third system of triangles follows the thirty-ninth parallel from New Jersey and California, passing through thirteen states, and affording an accurate basis for local surveys. Permanent posts are set. As fast as the work is completed geodetic charts are issued. The establishment of boundaries between the different states is recognized as a part of the legitimate work of the survey.

Coast Defense. See FORT.

Coast Guard, the name of the former revenue service and life saving service of the United States. Under an act of Congress approved January 28, 1915, it was provided that these two organizations should be established under one head and be known as the coast guard. The revenue cutter service had existed since 1790 and life saving service since 1848. The coast guard is to operate under the Secretary of the Navy in time of war and under the treasury department in time of peace. Under the act of Congress approved January 28, 1915, the transfer was made to the coast guard, the military system of the former revenue service serving as the basis

of its establishment. The coast guard was transferred to the navy department April 6, 1917, and was returned to the treasury department by an executive order August 28, 1919.

The transfer of the personnel of the former life saving service to the coast guard was accomplished by issuing appointments as commissioned officers, warrant officers and petty officers to the district superintendents, keepers and first class surfmen respectively, and regularly enlisting the other surfmen. On June 31, 1921, there were 414 warrant officers and 2,545 petty officers and other enlisted men. Warrant officers are appointed by the secretary of the treasury and hold their appointments during good behavior. The authorized commissioned personnel of the coast guard is 270. A coast guard academy is maintained at New London, Conn.

In 1921, there were 273 coast guard stations, divided into thirteen districts. Stations are located on the Atlantic coast, Gulf of Mexico, Great Lakes, Pacific coast, including Alaska, and one at the falls of the Ohio River, at Louisville, Ky.

In general, the duties of the coast guard are as follows:

1. Rendering assistance to vessels in distress and saving life and property.
2. Destruction or removal of wrecks, derelicts and other floating dangers to navigation.
3. Extending medical aid to United States vessels engaged in deep sea fisheries.
4. Protection of the customs revenue.
5. Operating as a part of the navy in time of war or when the president shall direct.
6. Enforcement of law and regulations governing anchorage of vessels in navigable waters.
7. Enforcement of law relative to quarantine and neutrality.
8. Suppressing mutinies on merchant vessels.
9. Enforcement of navigation and other laws governing merchant vessels and motor boats.
10. Enforcement of law to provide for safety of life on navigable waters during regattas and marine parades.
11. Protection of game and the seal and other fisheries in Alaska, etc.
12. Enforcement of sponge fishing law.
13. Patrol of Grand Banks for protection of shipping from ice.
14. Patrol of western rivers during floods and for other purposes.

In addition to the foregoing the services of the coast guard include many other things, such as warning vesels running into danger, medical and surgical aid to the sick and injured, recovery and burial of bodies cast up by the waters, extinguishing fires, maintenance of public order, acting as pilots in emergencies and furnishing transportation to other branches of the public service.

A summary of the operations of the United States coast guard for the fiscal year ending June 30, 1921, is given below:

Persons rescued from peril.....	1,621
Persons on board vessels assisted	14,013
Persons in distress cared for.....	650
Vessels boarded and papers examined	18,348
Vessels seized or reported for violation of law	340
Fines and penalties incurred by vessels reported	$86,610.00
Derelicts and obstructions to navigation removed or destroyed..	8
Instances of lives saved and vessels assisted	1,933
Instances of miscellaneous assistance	855
Value of vessels assisted (including cargoes)	$66,260,445.00
Net expenditure for maintenance.	$10,137,633.44

The coast guard has in service a total of 110 vessels, including cruising cutters, patrol cutters, harbor cutters and launches, and station ships.

CANADA. The Canadian Coast Guard (Life Saving Service), a branch of the Department of Marine and Fisheries of Canada, is not as extensive as is the United States Coast Guard; for while Canada has a great length of coast line, there is no navigation along a great part of it, particularly in the North. The lower ends of both the east and west coasts are important areas of maritime activities, however, as is the northern shore of the Great Lakes. A private organization is in charge of the service at Victoria, British Columbia, but the Dominion government safeguards all other points. In Nova

Scotia there are 16 stations; on the Great Lakes, 11; 4 in British Columbia; Prince Edward Island, 4; and 3 in New Brunswick.

Coast Range, a range of mountains extending from southern California through Oregon and Washington and into British Columbia. It forms the southwestern boundary of the central valley of California, where it consists of a series of great ridges. The valleys of the range in California are unsurpassed for beauty and fertility. The minerals found in the Coast and Sierra Nevada ranges are a source of great wealth to the states crossed by them. Many well known peaks rise from the Coast Range, among which are Tamalpais, Diablo, Loma Prieta, and Hamilton, on which the Lick Observatory is situated.

Cobalt, a metal resembling silver in appearance; but with a slight trace of red. It is brittle and highly magnetic. It is harder than iron, but melts more easily and is a trifle heavier. Cobalt occurs in nature almost always in company with nickel, and is produced with it. Compounds of cobalt, called cobalt salts, have a peculiar way of changing color. When dry they are blue, and when wet they are red. Ink made of a cobalt salt is accordingly red, and produces red writing; but if the writing be dried before a fire until it loses its moisture, the writing turns blue. Exposure to vapor brings back a red color. If the ink be made very weak the red will not show, but heat will develop the blue. In this way secret correspondence has not infrequently been carried on. A letter in ordinary ink is sent with a second letter in invisible ink written between lines. Cobalt is a fast mineral dye, giving its name to cobalt blue. It is used in the manufacture of stained glass, paints, colored porcelain, etc.

Cobalt, Ontario, a town in the northern part of the province, is the center of a district which claims to be the richest silver-mining area in the world. The town is situated on a lake of the same name, 330 miles north of Toronto, and 103 miles north of North Bay, with which it is connected by the Timiskaming & Northern Ontario Railway. The mineral wealth of the Cobalt district was discovered in 1903, and the first mines were worked in the following year. The shipment of silver increased from $136,000 in 1906 to more than $17,000,000 in 1912, a greater value than the silver output of the entire dominion had ever reached prior to that year. Since that record year the production has fallen off slightly, but is still the most valuable in Canada. In addition to silver, this district is rich in nickel, bismuth, zinc and cobalt ores. Population, in 1921, 4,449.

Cobb, Irwin Shewsbury (1876-), an American newspaper man, author and playwright, was born at Paducah, Ky., and at the age of 19 was editor of the Paducah *News*. After working for several years on various Kentucky newspapers, Mr. Cobb went to New York. He became a special and humorous writer on the *Evening Sun* and the New York *World*. Since 1911 he has been a staff contributor to the *Saturday Evening Post,* and during 1914 represented that magazine as war correspondent in France. In 1915 Mr. Cobb made an extensive tour of the United States, lecturing on his experiences at the front. Important among his writings on the war are *Paths of Glory* and *Europe Revised*. In 1918 he was made a chevalier of the Legion of Honor of France.

Mr. Cobb has written several plays, all in a humorous vein, among which are *Mr. Busybody, Back Home* and *Funabashi*. Among his many books are *The Belled Buzzard, Sundry Accounts, Local Color, Roughing It De Luxe, The Life of the Party, The Escape of Mr. Trimm, The Thunders of Silence* and *Mr. Pointdexter—Colored*.

Cobden, Richard (1804-1865), an English statesman. He received a limited education, but acquired commercial experience in a warehouse in London, and, with the help of friends, founded a successful manufactory of cotton cloth in Manchester. Later, he was able to travel, both on the continent and in the United States. He began writing pamphlets on political conditions, and took an active part in the anti-corn law agitation. In 1841 he entered

Parliament, where he became known as the "apostle of free trade." He was not only foremost in the repeal of the corn laws, but may be regarded as the statesman to whom, above all others, England owes her free trade policy. His services in Parliament led to the neglect of his own business. He became involved in difficulties; but friends raised a purse of $350,000 and presented it to him, so great was their appreciation of the value of his services in Parliament. He was offered numerous honors, including membership in the British cabinet and a baronetcy, all of which he persistently refused, preferring to represent the interests of the people throughout, as he understood them. Free trade clubs the world over, bear his name. See BRIGHT, JOHN; CORN LAWS.

Coblenz, or **Koblenz,** a city of Prussia. It is situated on a point of land formed by the junction of the Moselle and the Rhine. Coblenz is still a walled city. It is fortified by outposts. Ehrenbreitstein on the east bank of the Rhine is the most strongly fortified place in Germany. The city is well supplied with bridges. A stone bridge of fourteen arches erected in 1344 crosses the Moselle. There are three bridges across the Rhine; the Rhenish bridge, an iron structure of three arches; a railway bridge, a brick structure, also of three arches; and the famous Bridge of Boats, the latter being a level bridge of pontoon construction.

The situation of Coblenz is picturesque beyond description, but the town itself is prosy enough. If we except the church St. Castor consecrated in 1208, a Romanesque basilica with four towers, there are no buildings of national reputation. There are many points of minor interest, however. The writing table of Frederick the Great, and many articles formerly belonging to the electors of Treves, the royal family of Baden, are shown in the Electoral Hall. Population, 1920, 56,676.

See EHRENBREITSTEIN; MOSELLE.

Cobold, or **Kobold,** kō′bŏld, a domestic spirit in northern mythology. According to the *Edda,* Odin formed the dwarfs from dust. They were of two sorts. The gnomes occupy deep caverns. The cobolds are house spirits and, if kindly treated, nestle beside the hearth and are a protection to the home. See EDDA.

Cobourg, Ontario, the county town of Northumberland county, lies on the north shore of Lake Ontario about 70 miles east of Toronto. It is served by the Grand Trunk, Canadian Pacific and Canadian Northern railways, and has direct steamship connection with Montreal, Toronto and other ports on the St. Lawrence River and the Great Lakes. Two railway car ferries provide daily all-year service to Rochester, N. Y. Cobourg is noted as a summer resort, but it is also a manufacturing center, especially for woolen goods and steel products. During the World War it was a large maker of shells for the allied armies. Cobourg was founded in 1818, and was incorporated in 1850. Population in 1921, 5,327.

Cobra, a venomous Indian serpent of the viper family. The cobra belongs to the class of hooded snakes.. It is marked on the back of the neck with a figure resembling a pair of spectacles. It is sometimes called the "spectacled snake." It is a slender, active, deadly animal, about four feet long, infesting footpaths and copses. In the rainy season it takes refuge under the huts of the people. It makes its way into thatched roofs. It strikes without provocation and without warning. There is no certain antidote for its venom. As the peasants of India go barefooted, it is not strange that from 10,000 to 20,000 deaths from the bite of the cobra are reported annually. The government of India offers a standing bounty for its extirpation. Snake charmers go about enticing these dread serpents from their holes with tame snakes and music; then kill them. The cobra breeds rapidly; fifteen to twenty eggs are deposited in litter anywhere, and in a few days there are as many little cobras. The mongoose is the cobra's deadly foe. Kipling's *Second Jungle Book* describes a spirited contest between Rikki-tikki-tavi, the mongoose, and the venomous cobras. See ASP.

Cobweb. See SPIDER.

Coca, a shrub growing in Peru and Bolivia. The leaves, sprinkled with lime,

are chewed by 10,000,000 Indians of these countries and adjacent parts of Brazil. Coca lessens the pangs of hunger, dilates the pupil of the eye, and gives immediate quickness of step. Mountain climbers claim that it prevents shortness of breath. In some respects the qualities of the leaf resemble those of opium. Its extensive use is parallel to that of opium, betel, and tobacco by other people. Cocaine, a powerful drug obtained from the leaves, is well known to medical science. It is administered to lessen pain and is injected by surgeons to produce local numbness during an operation. See TOBACCO; BETEL.

Cocaine. See COCA.

Cochin-China, a French possession in Asia, forming the southermost part of Indo-China. It has an area of 21,980 square miles, and a population of 3,452,-248. The chief crop is rice, while coffee, tobacco, sugar-cane, oranges and bananas are also cultivated. The inhabitants are mainly Annamites. Cochin-China is divided into 17 provinces, has a resident governor and a council of 18 members, and is represented in the French parliament by one deputy. The chief town is Cholon, with a population, 1921, of 226,537.

Cochineal, kŏch-ĭ-nēl′, an insect valuable as a source of dye stuff. It feeds on a branching, almost tree-like, kind of cactus, plantations of which have been established for the purpose in Mexico, Peru, some parts of the West Indies, and, of late, in the Canary Islands, parts of Spain, Algiers, and Java. Cochineal dyes were known to the Mexicans before the invasion of that country by white men. The ladies of Queen Isabella's court begged Cortez to bring them a little of the beautiful dye. The cochineal industry has risen to millions of pounds of insects annually—far beyond the possibilities of the irregular supply formerly brought in by Indians.

The first step is the establishment of a field of cacti. This may be done by seed, by seedlings from a nursery, or best by cuttings, or lobes, planted where they are to grow. The field is ready in a year or two. A supply of insects with their eggs is then placed on each plant, and the young are left to grow up. The insect belongs to what Comstock calls mealy bugs. It is related also to the insect that produces shellac, and to various scale insects that have become orchard and field pests. The full grown male has a pair of wings and two pairs of eyes, but no way of seizing food. The female is a great eater, but has no wings or other means of making her escape. There are perhaps 150 females to one male; and it is the female heavy with eggs that is valuable. They are brushed off the cactus with soft brushes into bags, and are killed at once by dipping in hot water or being put into an oven. A workman gathers about two ounces a day. The insect is of a reddish brown, covered with a white, mealy powder, and is of the size of a small split pea. Seventy thousand are required to weigh a pound. Cochineal dye is produced by steeping the insects. It is scarlet and carmine, of great brilliancy. Cochineal makes a fine red ink as well.

Cockatoo. See PARROT.

Cockatrice. See BASILISK.

Cockayne, The Land of, or Cockaigne, kŏk-ān′, a satirical poem, supposed to have been written by Michael of Kildare during the thirteenth century. It has been said that it is "probably the earliest specimen of modern English poetry which we possess." There is also an old French poem of the same title. The word Cockayne, although of uncertain origin, is probably from an old French word signifying abundance. Cockayne was an imaginary land of idleness and plenty. "The houses were built of cake and barley sugar; the streets paved with pastry; roast geese went slowly down the streets inviting the passers-by to eat them; buttered larks fell in profusion; and the rivers ran wine." It was doubtless intended to ridicule the stories of Avalon, the mythical island in the west. In the sixteenth century the word Lubberland was used with the same significance. The term Land of Cockaigne has been derisively applied to both London and Paris. See AVALON.

Cockchafer. See MAY BEETLE.

Cockfighting, an ancient sport, presumably of eastern origin. The natural pugnacity of two male birds is taken ad-

vantage of to afford amusement to the spectators. While the term is applied particularly to fighting between two males of the domestic fowl, the natives of the Indies pit the males of the bulbul or eastern nightingale against each other, and the ancients appear to have pitted quails and partridges. The breed of fowls noted for fighting is a spare, tough, pugnacious variety of chickens known as gamefowls and the males as gamecocks. They weigh from four to five pounds. They have strong spurs which are frequently reinforced with steel or silver prongs fastened to the leg with straps. In fighting the cocks are set head to head on a plot of turf, called a pit, and are allowed to fight without interference. A contest between two well matched birds is a cruel and bloody one. They often fight until completely exhausted. More frequently, however, the overpowered bird puts out for a place of safety, while the other, if he has the strength left, celebrates his victory by a flap of the wings and a crow of triumph. Although under the ban and frequently forbidden by law, cockfighting still has its votaries, both in England and America. It is a favorite form of amusement throughout the Spanish-American countries. In the Philippines each village has its cockpit and each villager his gamecock. Their respective ancestry and qualities are a staple article of village talk. A recent writer states that when the thatched hut of a native takes fire, as so combustible an affair is pretty sure to do, wife and children get out the best way they can. His first care is the safety of the coop in which his gamebird is confined. This does not seem so strange when we remember that a horseman's first thought is for his racer when his barn takes fire.

Cock Lane Ghost, the name given to the imagined cause of certain knockings which were heard in the house of a Mr. Parsons at No. 33 Cock Lane, Clerkenwell, London, in 1762. A "luminous figure" was said to have been seen in the same house. Dr. Johnson wrote an account of the supposed phenomena for the *Gentleman's Magazine.* In consequence Johnson was severely attacked for his credulity in a poem entitled, *The Ghost,* by Churchill. It was decided that the strange occurrences had been produced purposely by Mr. Parsons and his little girl. Mr. Parsons was therefore pilloried. The expression "Cock Lane Ghost," has come to be used to designate any tale of fright or credulity that is purely imaginary.

Cockle, a word of many meanings, most of which the dictionary defines sufficiently.

In zoölogy cockle is the name of a genus of bivalve mollusks comprising many species. They are widely distributed, forming an article of diet along the coasts of almost every country of the world. The two valves or shells are almost exactly alike, very closely locked together, and showing decided, often spiny, ridges running from hinge to edge. The cockle's most interesting characteristic is a large, fleshy, elastic foot by means of which it propels itself in a series of awkward leaps. It can also bury itself in muddy sand or emerge therefrom with great ease.

The gathering of cockles gives employment to many people in certain parts of Great Britain. In some places these mollusks are reared in "cockle gardens," and such cockles are said to excel in flavor.

In botany the cockle or corn-cockle is a plant belonging to the pink family. It is a native of Europe and western Asia but now is to be found in almost all parts of the world. It grows to a height of from one to three feet and bears a large purple blossom. It is found in grain fields and waste places, and becomes often a troublesome weed, as the seed must be screened from grain, for which process a special sieve is required. The best way to combat it is to sow grain which is entirely free from the seed of cockle.

Cocklebur, a weed which has proved very troublesome on cattle and sheep ranges. The plant belongs to the family of composites and was introduced into this country from Europe. The burs are hard and covered with hooked prickles. These prickles are not only annoying to animals, but if once entangled in the wool of sheep it is almost impossible to get them out. As the plant dies down to the ground each autumn its growth may be controlled by destroying all plants before the seed ripens.

Cock of the Rock (so called because it builds its nest on rocks), a bird of northern South Africa, belonging to a sub-family of the cotingas, of which three forms are known. It has a flat-sided crest, orange plumage, and is about the size of a large pigeon. The female is of a dull brown, without crest.

The skin of these birds is very valuable, as it is used for decorative purposes and in millinery, hence they are becoming very rare and threatened with extinction. They inhabit rocky water courses and bushy hillsides, and make their nests of mud. These birds are of the class which court the females by dancing in open spaces, when they display their gorgeous feathers until they are chosen as mates by their observers, the hens,

Cockran, (William) Bourke (1854-1923), an American lawyer and politician, was born in Ireland, educated in France, and later came to the United States. He taught school, studying law at the same time, and was admitted to the bar in 1876. He was elected to Congress in 1886 and again in 1890. He opposed the nomination of Cleveland in 1892, supported McKinley in 1896, and in 1906 was an advocate of Bryan. He was again elected to Congress at a special election in 1904 to succeed George B. McClellan, and was reelected in the same year for the term of 1905-07. He was not a candidate for reelection, and resumed law practice in New York. He died March 2, 1923.

Cockrell, Francis Marion (1834-), an American lawyer and politician, was born in Johnson County, Mo. He graduated at Chapel Hill College in 1853 and engaged in the practice of law at Warrensburg, Mo. During the Civil War he served in the Confederate army, and was made a brigadier-general. He was Democratic Senator from Missouri from 1875 to 1905. From 1905 to 1910 he was a member of the Interstate Commerce Commission, and in 1911 was United States Commissioner to reestablish the boundary between Texas and New Mexico.

Cockroach, a night insect allied to crickets and grasshoppers. The body is flat and oval when seen from above. The insect runs rapidly instead of jumping. Some species are wingless. Our native cockroaches are out-of-doors insects, preferring to live in fields and forests. During the day they conceal themselves under sticks and stones. The pale brown Croton bug or cockroach that hides about waterpipes and infests pantries is an immigrant from Asia. It is thought to have reached Europe and America in ships' cargoes. It is fond of flour and meal. It dreads powdered borax. It may be banished easily by the free use of insect powder.

Cock's-Foot Grass, a genus of grasses, closely akin to fescue, but differing in habit. The common or rough cock's-foot grass is a native of Greenland, Arctic America, the mountainous parts of North America, and is found in great abundance in Great Britain. It is of importance as forming part of both natural and artificial pasturage. In the United States this grass is called orchard grass, and is widely cultivated. The tussac grass belongs to this genus also.

Cocles, Horatio, a hero of ancient Rome, who alone, in 506 B. C., opposed the whole army of Porsenna at the head of a bridge, while his companions were destroying it behind him. When this was accomplished, Cocles, though severely wounded and hampered by his weapons and armor, leaped into the Tiber and swam to safety.

Cocoa, kō′kō, **Cacao,** or **Coco,** the seeds of a tropical tree. By right the name should be spelled cacao, which would also avoid confusion with cocoa-nut, a seed as large as a child's head, while cacao or cocoa seeds, or beans as they are frequently called, are more like shelled almonds. Cocoa must be distinguished also from coca. Several species of small trees produce cocoa beans. Our supply comes chiefly from one of them. It grows in Portuguese Africa, in tropical America, and the West Indies.

The tree which produces cocoa beans branches at the height of a man's head, and bears cucumber-shaped pods several inches in length with a thick, warty rind. The pod contains a sweetish pulp, of the consistency of soft butter, and a handful of fat beans. The tree comes into full

bearing in seven years, and yields two crops a year for thirty or forty years. The fruit is subjected to fermentation for a few days, often by burial in the earth, after which the beans are washed and dried.

Mexican Indians were users of cocoa before the discovery of America. Prescott tells of the vast quantities of cacao found growing along the Pacific coast by Pizarro and his followers, and of the use of cacao in Montezuma's household. "He was exceedingly fond of it, to judge from the quantity, no less than fifty jars or pitchers being prepared for his own daily consumption. Two thousand more were allowed for that of his household." Bags of cacao beans were used for money. The Mexicans called the beverage made from cacao chocolate, or cocoa water, whence our name chocolate.

Once the beans have been fermented, cleaned, and dried, they are ground. The fermenting takes the place of roasting for coffee. Pure cocoa goes on the market either in this form or as beans. Ground cocoa, even from the best houses, is likely to contain a judicious quantity of other material.

As ordinarily understood, chocolate is prepared by making a paste of ground cocoa, usually with sugar and such flavoring as cinnamon, cloves, or vanilla. The paste is compressed into cakes in iron molds and wrapped for the market. Chocolate is adulterated by putting in rice flour, starch, hazel-nuts, almonds, and cheap spices. The less gritty a cake of chocolate the purer the chocolate. The loose, dry powder is sold as cocoa; the sweetened cakes as chocolate. The world's annual production of cocoa is about 300,000,000 pounds. Of this amount the United States consumes a fourth. The demand is increasing rapidly. Ecuador leads the nations in the production of cocoa. The importers of Hamburg, Havre, and New York are the largest buyers.

The trees from which the different kinds of cocoa products are derived belong to the genus Theobroma, which signified in Greek "food of the gods." These trees require a deep rich soil, heat and moisture, for the most favorable growth. The yield per tree under favorable conditions will reach 15 to 20 pounds annually of cured cocoa seeds, or cocoa-beans, as they are called in commerce. Usually, however, the yield is from 2 to 3 pounds per tree, or from 400 to 600 pounds per acre.

Cocoa is very nutritious. The principal constituent of cocoa-nibs is a soft, solid oil, which forms more than 50 per cent of the shelled cocoa bean; about 22 per cent being starch, gum, etc., and 17 per cent gluten and albumen. The crystallizable constituent is called theobromine. Commercial cocoa contains approximately 21.5 per cent of protein, 29 per cent of fats, and nearly 40 per cent of carbohydrates. Chocolate contains about 13 per cent of protein, 48.5 per cent of fat, and 30 per cent carbohydrates. Nine-tenths of cocoa is assimilated in the human system. The pulp of the bean is eaten in the countries where the trees grow, and a kind of spirit is obtained from it by fermentation and distillation.

The cocoa pod grows out from the trunk of the tree, and when it is cut open it discloses five compartments or cells, each containing a row of from five to ten seeds or cocoa beans. When these beans arrive at the factory, after the process of fermentation and drying already described, they are treated in various ways to bring out their aroma and render the product more palatable and digestible. When the husks or shells of the beans have been removed the product is called cocoa-nibs, and this is the simplest and purest form in which cocoa is sold. Cakes of chocolate are made from these nibs by heating, flavoring, rolling and pouring into molds. Chocolate-covered candy is made by nipping the substance prepared for the inside in a pan of liquid chocolate paste, and then placing the separate pieces in tins to cool and harden. Much of the choicest chocolate confectionery is now made by machinery. The consumption of cocoa and chocolate has vastly increased in the United States since the passage of the prohibition law.

Cocoa butter is a pure white solid fat, obtained from the seeds of the cacao tree in the process of working them up into cocoa. It has a pleasant odor and a

chocolate-like taste. It is used in making soap, ointments, cosmetics and other pharmaceutical preparations; also in the manufacture of confectionery. Substitutes for cocoa butter are made from the solid fats obtained from palm-nut or cocoanut oils.

Cocoanut, the well known nut of a palm tree. The natural home of the cocoanut palm is on the shores of the low tropical islands of the Pacific. It is an important tree in Ceylon, Sumatra, Java, the Philippines, and Hawaii. The trunk of the tree is a foot or two in diameter. It rises straight and trim, carrying a crown or tuft of leaves at a height of seventy-five to one hundred feet. The leaves wave gracefully like plumes. Many are from ten to twenty feet in length and are used by the natives to thatch their huts. The nuts hang at the bases of the leaves in clusters of ten or fifteen. Several clusters may be expected to ripen during the year. A Jamaica tree yields 100 nuts a year. Cocoanut trees follow the coast in a fringe, and plant themselves naturally. Nuts fall from overhanging trees into the sea and are carried like boats along the coast and cast up to take root anywhere. A tree matures in seven or eight years and bears during the lifetime of a person. Cocoanuts are pretty well known all over the world. The fresh milk is a fit article of food. Dried cocoanut meat or copra, is an article of commerce from which seventy per cent of its own weight of cocoanut oil is extracted. Thirty ordinary nuts will yield a gallon of oil. It is used extensively to make stearine candles and soap. Like that of other palms, the sap of the cocoanut tree yields a sweet wine called toddy by the Hindus. On undergoing fermentation and distillation, sweet toddy yields arrack, as the Arabians call it, the alcoholic liquor of the tropics.

The cocoanut tree is put to many uses by the natives. The husk of the nut is surrounded by a fiber called coir, from which paper, twine, ropes, matting, doormats, mattresses, brooms, and brushes are made. The shell is used for ladles and cups. When burnt, it produces an excellent lampblack. Cocoanut charcoal is excellent as a powder for the teeth. The young leaves of the trees are eaten like cabbage. Cloth, hats, bonnets, fans, baskets, bedding, thatch, and fish nets are made of the leaves. The trunk is used for canoes, posts, rafters, and fences. The ribs of the leaves are used for paddles, spears, arrows, and torches. In fact, the uses to which the cocoanut palm may be put rival those of the bamboo in variety and number. Cocoanuts ripen and fall the year around. Average cocoanuts are worth about twenty dollars a thousand in New York, London, and other prominent seaports. American imports of cocoanuts and cocoanut products for a recent year were $3,500,000.

See COCOA.

Coconut, or Robber, Crab a large terrestrial crab of the East Indies, which feeds on cocoanuts. It is found on the islands of the Indian and South Pacific Oceans, and often attains a size enabling it to grasp the largest nuts. It digs tunnels, which it lines with the fibers of the cocoanut, and here it makes its home. While it frequently climbs into the palm trees, it does not gather nuts there, but contents itself with those fallen to the ground, from which it makes its food. To reach the contents of the nuts, it is said that this crab first tears away the fibers, and then hammers with its claws on the nuts until holes are made, through which it extracts the kernel by means of its smaller pincers. This crab has its gills so modified that they function as lungs. It goes to the water at times, and periodically resorts to the sea to spawn, where the young pass through their development stages in the water like other crabs. Darwin, in *A Naturalist's Voyage,* has written of this crab. Several species of it have been found.

Cocoon. See SILK; INSECTS.

Cocytus, kō-sī′tus, in classical mythology, a river of Hades. The name came from a Greek word meaning to weep, and the Cocytus was the "River of Lamentation." Those whose bodies had not received burial rites were doomed to wander a hundred years on the banks of this stream before the ferryman Charon could take them across. See HADES.

Some poetic descriptions of Cocytus are:

Cocytus, named of lamentation loud,
Heard on the rueful stream. —Milton.

A blacke flood, which flowed about it round—
That is the river of Cocytus deepe
In which full many soules do endlesse wayle and weepe. —Spenser.

There stood the first and prayed him hard to waft their bodies o'er,
With hands stretched out for utter love of that far-lying shore;
But that grim sailor now takes these, now those, from out the band,
While all the others far away he thrusteth from the sand.
. . . Those borne across the wave
Are buried; none may ever cross the awful roaring road
Until their bones are laid at rest within their last abode.
An hundred years they stray about and wander round the shore,
Then they at last have grace to gain the pools desired so sore. —Virgil.

Cod, an important food fish. There are some sixty species of cod and closely allied fishes. The common cod is spindle-shaped with a long tail. The skin is furnished with small, soft scales, inclosed in sacs. The mouth is wide. The lower jaw is furnished with a single feeler and the pair of lower front fins are reduced to the same office. The general color of the fish is brown above with dark spots, and silvery sheen beneath. It is from two to four feet long and weighs from two to seventy-five pounds. It is common in the North Atlantic from Greenland and Norway to Virginia and Spain, and in the North Pacific as far south as Oregon. The coasts of Norway, the British Isles, and especially the Banks of Newfoundland are noted for cod fisheries. Cape Cod was so named by the early navigators for the abundance of cod found off the coast. At certain seasons, cod approach the Lofoden Isles, off the coast of Norway, in shoals 100 feet deep, estimated to contain not less than 120,000,000 fishes.

Cod are taken with hook and line, the largest at a depth of 150 to 250 feet. Long lines secured with anchors, and having short lines attached at intervals of six feet, are set. A single schooner may set several trawls of this sort, carrying 12,000 or 15,000 hooks. The fishermen go along the lines in their dories, taking in the fish, and rebaiting the hooks. Cod are caught also by hand lines lowered from the sides of the fishing boat. Small fish and shell fish are used as bait. When cod are biting, a fishing boat is a busy place, as is expressed by the saying, "Fish, cut bait, or go ashore."

The eggs float. The young hatch in twelve days and attain the size of minnows in a few weeks. In a year they are a foot long. It is said that a 75 pound codfish produces 9,000,000 eggs in a single season. Nevertheless, the incessant fishing for cod has diminished the catch very noticeably. Over half the population of Newfoundland is engaged in codfishing. Boston and Gloucester, Massachusetts, handle about $3,000,000 worth of codfish annually. The total catch of the North Atlantic is estimated at about $25,000,000.

Codliver oil, obtained from the livers of the cod, is prepared in Great Britain, Iceland, Norway, and Newfoundland. It is used for dressing leather, and has of late obtained importance in medicine as a cure for consumption. Firms engaged in the purchase of oils for this purpose select the livers with care, and insist on the utmost cleanliness in rendering and bottling. The codliver oil having the best reputation with physicians is pressed from winter cod at the Lofoden Isles. It is marketed by way of Christiania.

The United States fish commission hatches and liberates about 350,000,000 young cod annually.

See FISH; ST. PIERRE.

C. O. D., an abbreviation of "collect on delivery." A clerk or messenger may be sent to deliver goods with instructions to collect the pay for the goods on delivery. Merchandise may be sent C. O. D. by an express company to be delivered on payment of the price. The company charges the customer for carrying the goods and charges the merchant for carrying back the money. See EXPRESS.

Code. See CIPHER.

Code, a systematic compilation of law, authorized to take the place of preceding laws. By the successive enactment of new laws, repeals, amendments, and reënactments, the laws of a country gradually

grow into a state of confusion. Only the best trained lawyers know where to find all the law on a given point. When the law of centuries is gathered together and straightened out,—the law on divorce, for instance, being set forth clearly in a single paragraph or chapter, and all dead clauses omitted,—such a compilation is called the code. If approved by legislative authority, it takes the place of all prior law, and is the only law of the land. One of the most famous codes is the Justinian code, prepared by ten Roman lawyers in the reign of the Emperor Justinian. It is the foundation of most of the law of the civilized world. Another noted code is the code of Napoleon, prepared under the direction of Napoleon Bonaparte. It took effect in 1804-10. The code of Napoleon is the basis of the law of Louisiana, that state having been at one time a French possession. English law has not been codified. Prussian law was codified during the reign of Frederick the Great. In the United States, the most notable code is that prepared for New York under the supervision of the learned David Dudley Field in 1865. Although the legislature of New York could never be brought to adopt this code, it has formed the basis of codes for a score of states from Ohio to Oregon. See DECEMVIRS; JUSTINIAN I.

Code Napoleon. See LAW.

Codlin-Moth, the well known pest of the fruit grower. The adult is a beautiful little moth, with finely mottled gray, or rosy, front wings. The ends of the fore wings are marked by a brownish spot crossed by small, irregular golden bands. The moth lives in the pupa stage over winter. It emerges in late spring and lays its eggs in apple blossoms, just as the petals are about to fall. As soon as the eggs have hatched, the larvae begin to burrow into the young apple. The "worms" live in the core of the apple and cause the fruit to wither and fall. When full grown, the larvae eat their way out through the side of the fruit. They then spin their cocoons in some sheltered place and remain dormant over winter. The codlin-moth is the worst enemy of the orchard. It has to be fought by spraying the trees with a copious shower of Paris green water as soon as possible after the petals fall. Particles of Paris green, lodging in the calyx, are eaten by the young larvae. "The falling spray," says Comstock, "lodges in the blossom end of the young apple, and the larva which hatches from an egg laid in this position gets a dose of poison with its first meal, and dies before it can eat its way into the apple." One authority says that $8,000,000 a year are spent in spraying American apple orchards to prevent the ravages of the codlin-moth.

Codliver Oil. See COD; OIL; LOFODEN.

Cody, kō'di, **William Frederick** (1846-1917), an American scout and showman, best known as "Buffalo Bill," born in Scott County, Iowa. The family moved to the vicinity of Fort Leavenworth, and here, while still a child, young Cody was employed by express companies to carry packages across country on horseback. He was hardly out of boyhood when he was employed as a government scout. He became distinguished as a fearless rider, a keen and skillful hunter, and an expert plainsman. Cody won the name of Buffalo Bill by contracting with the Kansas Pacific Railway Company to supply its laborers with buffalo meat. It is said that he killed over four thousand buffaloes during one season. In 1883 he succeeded in organizing the "Wild West Show," a scheme he had long cherished. He gathered a large number of Indians and cowboys, collected much valuable material, of which the famous "Deadwood Coach" is perhaps the best example, and presented an exhibition of early frontier life which became known the world over. Cody is the last of the six great scouts of America. The others are Boone, Carson, Crockett, Bridger and "Wild Bill."

Co-education of the Sexes. In the United States over 96 per cent of pupils enrolled in elementary schools are in mixed schools. In public secondary schools the per cent is slightly less, being about 95. The high schools where the sexes are separated are found principally in Boston, New York City, Philadelphia, Baltimore, Charleston, and New Orleans. The establishment

of manual training high schools has increased slightly the proportion of pupils in separate schools. The large majority of women in colleges are in co-educational institutions. Excluding institutions of higher learning for women only, we have in the United States 68 per cent of such institutions co-educational.

In foreign countries we find a different state of affairs. In England 65 per cent of elementary pupils are in mixed schools, in Scotland 97 per cent, in Ireland 51 per cent. In France separate schools are the rule in elementary departments, but sentiment is gaining in favor of mixed schools. In the German States separate elementary schools for the sexes are maintained as far as practicable. In Italy segregation is almost universal. In Scandinavian countries conditions more nearly like those in the United States prevail. In England separate secondary schools are the rule, but highly successful experiments in co-education are being conducted in Keswick and Harpenden. In Germany the Grand Duchy of Baden has made extensive experiments in co-education in secondary schools and favorable reports are given out, but, generally speaking, segregation is the practice. Attempts are being made to bring the secondary schools for girls up to the efficiency and scope of schools of like grades for boys. As far as higher educational institutions in Europe are concerned, women are for the most part excluded. However, sentiment in favor of their admission seems to be gaining. Evidence of this is the increasing attention to subjects in which women especially are interested, such as domestic science and home and municipal sanitation.

To return to the United States, it may be observed that the number of girls in secondary schools is increasing at a much more rapid rate than the number of boys. The same may be said of higher institutions of learning, if we leave out of consideration the professional and technicological schools. Two reasons for co-education are chiefly responsible for its extent. It is more economical thus to educate, in the opinion of very many parents. The belief in the justice of equal opportunities for the young regardless of sex also acts to increase the number of co-educational institutions. However, the latter cause for increasing co-educational institutions is also the basis for agitation for segregation of the sexes. It is contended that equal opportunity for each sex demands unequal education, or, at least, a different education for the sexes. What educates one may not educate another at all. If the sexes require different preparation in order that each may fulfil its function, then co-education may be injurious for either if it is adapted to the other. The main arguments for and against co-education are as follows.

The movement for segregation of sexes in secondary and higher institutions of learning assumes fundamental sex differences. It attempts to prevent an alleged fatal feminization of education due to the preponderance of girls in boys' schools, or even the presence of girls at all in such schools. It is feared that otherwise the tendency will be to emasculate education so that it may not be too rugged for girls. With the progress of civilization we have an increased differentiation of function, and this bears on the question of education. The docility of the girls may be inspiration to better manners on the part of the boy, but he loses virility. He may have too good manners. He should work off his natural brutality to a certain extent. The girl, too, loses some of the bloom of the maiden. Thus there is a loss on both sides of the distinctive characteristics of each sex.

Girls are superior in certain studies, language for example. Girls like the classification element in botany, while boys prefer studying the habitat of plants. Therefore, in all points in the curriculum, not only is there a difference of taste as to subjects but as to the carrying out of the instruction in each subject. G. Stanley Hall says: "When we look the facts squarely in the face, we find that constant association of the sexes tends to rub off a little of the charm which each normally feels for the other." From this point of view it is argued that co-education tends to lessen the probabilities of marriage.

On the side of co-education it is contended that the objections urged against the custom are valid as against the abuse of the system and not against co-education itself. Schools may be "feminized" by effeminate men more effectually than by womanly women. The choice of electives in secondary and higher institutions removes objections urged against boys and girls being educated in the same institution. Injuries to the health of girls are due to ignorance of simple hygienic laws, and may be avoided without segregation. Courteous manners are not evidences of loss of virility. Ideals of conduct are not properly related to sex. Vice flourishes under conditions in separate schools for men, and it is urged that young men thus objecting are the dissolute or the boorish. Referring to the question of marriage, David Starr Jordan says: "It is true, no doubt, that cultivated women are more exacting than are other women. They are less likely to marry for convenience, and they expect more of their husbands. For these same reasons their marriages are less likely to prove unhappy."—A. W. RANKIN.

Coeur D'Alene, Idaho, the county seat of Kastenai Co., 33 miles east of Spokane, Wash. The city is situated on the shore of Lake Coeur D'Alene. City and lake take their names from the Indian tribe that once inhabitated the region. The lake and the surrounding mountains form a picturesque setting for the city, which contains manufactories of ties, shingles, lumber and bricks. A trade in fruits and farm products is carried on. It is served by the Northern Pacific and the Chicago, Milwaukee & St. Paul railroads. It contains the Coeur D'Alene College and the Catholic Academy. Here also are the Old Fort Sherman military grounds. The population in 1920 was 6,447.

Coeur de Lion, kûr de lī′ŏn, lion-hearted, a name given to Richard I of England, because of his courage. See RICHARD.

Coffee, kŏf′fē, the dried seed of a laurel-like evergreen shrub. Its native home is Abyssinia or Arabia. It grows to a height of six to thirty feet, but in cultivation it is pruned to bush a little higher than a man's head. Coffee trees are started in nurseries and are transplanted like fruit trees. A tree begins to bear when three years old, and produces from one to five pounds for twenty years. Methods of cultivation do not seem to differ materially from those used in raising cherries which, in fact, the ripe fruit resembles. In harvesting, the ripe berries are shaken down on cloths under the trees, the fruit is dried in the sun, then pulped, as the process is called, and washed. After drying again, and hulling and cleaning, the coffee beans are picked over, sorted, and put up in bags for market. Machines have been invented for removing the pulp green, thereby hurrying the crop to market. Mocha coffee gets its name from an Arabian port that formerly exported coffee. The supply of Mocha coffee is limited. There are no plantations. It is produced by groves of bushes surrounding the homes of the Arabs. Most of it is used by the Arabs themselves. Local dealers purchase small quantities, much as traders buy blueberries from the Chippewas. When a load has been collected in this tedious way, it is sent off in a caravan to Aden, perhaps 700 miles away.

Rio coffee is named from a Brazilian seaport. Brazil produces two-thirds of the world's coffee. Java coffee is supposed to come from the island of Java, but it is difficult to rely on names any more. Ceylon, Porto Rico, Cuba, Hawaii, and the Philippine Islands have large plantations or coffee orchards, as they are sometimes called. The United States is the great coffee market of the world, the people of Great Britain and the Continent being more inclined to tea. New York receives more coffee than any other city in the world. Ground coffees are so adulterated with carrot, parsnip, dandelion, beans, peas, lentils, and other cheap ingredients that public favor has been extended to whole coffee that may be ground by the grocer under the eye of the purchaser. Even then artificial coffee beans are palmed off. Adulterants mixed with coffee are ground up into a sort of dough. Machines have been devised for pressing kernels out of this paste that when dried and roasted look enough like the genuine to pass careless inspection.

The use of coffee as a beverage probably originated in Abyssinia, passed to Arabia several centuries later, and is said to have been made known in Europe by L. Rauwolf, a German physician, whose travel sketches appeared in 1573. Soon after, coffee-houses were established in several European countries, and gradually became popular places of resort. Some of the London coffee-houses became famous in English literature. The first established in that city was opened in 1652 by a Greek, who had been the servant of a London merchant. When it became known that this merchant had brought home a quantity of coffee from Smyrna, his house was overrun with friends and visitors, anxious to taste the new beverage, and in self-defense he established his servant in business as keeper of a coffee-house. In 1671 the first French coffee-house, or cafè, was opened at Marseilles, and Paris soon afterward had several.

These places of refreshment, which sometimes furnished both food and lodging, long held in Great Britain a position somewhat similar to that of the clubhouses of the present day. Each had its special circle of regular guests and visitors, and became a center for literary, scientific, religious or political discussion. Before newspapers were common the coffee-house was a great means of spreading news, and exerted a powerful influence in politics. This was particularly the case in the eighteenth century, of which Macauley wrote:

> The coffee-house must not be dismissed with a cursory mention. It might indeed, at that time, have been not improperly called a most important political institution. The coffee-houses were the chief organs through which the public opinion of the metropolis vented itself. . . Every man of the upper or middle class went daily to his coffee-house to learn the news and discuss it. Every coffee-house had one or more orators, to whose eloquence the crowd listened with admiration, and who soon became what the journalists of our own time have been called—a fourth estate of the realm.

The English coffee-houses had their counterpart on this side of the Atlantic in American colonial days; and at the time of the Revolution there were flourishing coffee-houses in New York, Philadelphia and Boston.

Coffee as a beverage acts as a slight stimulant, promoting cheerfulness and removing languor; but in some cases it induces sleeplessness and nervous trouble. Its active principle is caffeine, an alkaloid found also in tea and other vegetable products. The amount of caffeine found in coffee and tea varies with the product; coffee usually containing less than 1 per cent, while amounts varying between 2 and 4 per cent have been found in different samples of tea. The alkaloid found in tea is sometimes called theine, but it has been proved to be identical with the caffeine of coffee. This alkaloid has absolutely no nutritive value, but is used in medicine to combat certain forms of nervous and cardiac depression, certain headaches and neuralgias, gout, the insomnia of alcoholism, and the narcotic influence of opium.

Coffee is best when the berries are fresh roasted. They should not be darker than a light-brown color, which indicates that they have been sufficinetly roasted to bring out the aroma and other excellent qualities. The effect of adding chicory, the chief adulterant of true coffee, is to deepen the color, and its use is not injurious. All the substitutes for coffee lack the most important constituent of the real article, namely caffeine, and are therefore very different from coffee in their qualities and effects.

In the East coffee is not prepared as a beverage in the same manner as it usually is in Europe and America, but is either drunk thick, with sediment, following the usage of the Turks, or is made from the dried pulp, in much the same manner as tea. The latter is the method followed by the Arabs of the desert; and a more curious method is found among the Somali tribes of Africa, who boil the berries in oil and soak corn in the mixture. The "Sultan's coffee" of the East is made by boiling the husks of the coffee-bean, with the dried pulp roasted.

In the United States the average consumption of coffee is over ten pounds per capita. In the year ending June 30, 1922, the imports of coffee reached 1,238,012,078 pounds, valued at $148,502,658. Large quantities of apparatus, including electric percolators, are sold annually for the prep-

aration of coffee as a beverage in the home; also many varieties of coffee-mills for home-grinding of coffee-beans. In recent years cereal imitations of coffee have had a large sale. These are made of such materials as parched grains, peas, etc., and are sold on their merits, without posing as true coffee. Only a portion of the material is soluble, and the beverage obtained from the infusion of both genuine coffee and cereal coffee contains an average of only 2 per cent nutritive matter and 98 per cent water.

Coffeyville, Kans., a manufacturing city, 150 miles south of Topeka, on the Verdigris River. The city, named for A. M. Coffey, a member of the first legislature of the territory of Kansas, was once a shipping point for cattle driven up from Indian Territory and from Texas. It is near a natural gas field, has oil refineries, and its manufactures include vitrified bricks and tile, bottles, window glass, pottery and flour. It has a public library and good public schools. Population, 1920, 13,452.

Cofferdam, a contrivance resorted to by bridge builders. A typical cofferdam may be likened to a huge barrel without head or bottom. It is built around the spot where it is desired to erect a pier. Water and mud are pumped out, enabling workmen to enter and lay a proper foundation for the proposed pier. If the bottom, for instance, be of clay it may be possible to excavate to some depth to secure proper footing. In such cases the caisson (which see) is employed.

Coffin, Charles Carleton (1823-1896), an American novelist. He was born at Boscawen, New Hampshire. After receiving an academic education he turned his attention to civil engineering and later to telegraphy. When about thirty years of age he began to write for Boston newspapers and during the Civil War was correspondent for the Boston *Journal*. He also reported the Austro-Prussian War of 1866 and the Paris Exposition of 1867. From this time he was engaged chiefly in literary work, his earlier works being published, as were his letters over the name of "Carleton." His works include *Days and Nights on the Battlefield, Winning His Way, Boys of '76, Old Times in the Colonies, Story of Liberty, Following the Flag, Life of Garfield, Life of Lincoln, Caleb Krinkle.*

Coffin, Levi, a noted American abolitionist. He was born near Newgarden, North Carolina, in 1798, and died in Avondale, Ohio, in 1877. His father was a farmer. Young Coffin removed to Ohio and engaged in farming. He took an active interest in the colored people, and was one of the most persistent and prominent of those who helped runaway slaves on the way to Canada, being known, in fact, as the "president of the underground railway." See UNDERGROUND RAILWAY.

Cognac, kōn′yȧk, a noted brandy, so called from the town of that name in southwestern France. It is made by fermentation and distillation from white grape wine. See ALCOHOL; WINE.

Cohesion, the attraction or force by which the various particles of the same material cling together. The attraction between paint and wood is adhesion. The attraction between the particles of a copper wire is cohesion. If wires of the same size be tested for their strength of cohesion, that is to say, for their breaking strength, the relative results are about as follows: Gold, 15; silver, 19; platinum, 26; copper, 30; soft iron, 36; steel, 56. Heat diminishes attraction of cohesion. Liquids have less cohesion than solids. If a substance be heated sufficiently, attraction of cohesion may be entirely overcome and repulsion set up, that is to say, the substance may be converted into a gas. See GLUE.

Coin, a piece of metal passing from hand to hand as money. Coin is also used in a collective sense for metallic money. An establishment in which coin is made is known as a mint. The study of coins is called numismatics. It has been the practice from antiquity to stamp coins with the portrait of some ruler or other person whom it is desired to honor. The side of the coin which contains the face or portrait is called the obverse; the other side is called the reverse. Our only knowledge of the features of Alexander the Great and other historical personages is derived from the obverse of ancient coins.

The collection and sale of old coins has become a business in itself. Dealers in the Old World cities fill their windows and showcases with trays containing a bewildering display of coins from all parts of the world. The ruins of ancient cities have been ransacked for specimens of coinage. It is surprising how many different coins have been found in China, Japan, India, Persia, Turkey, Egypt, and other seats of ancient civilization. Greek coins are found in the excavations of old temples and sites of former cities. Schliemann found coins in old Troy. Roman coins are found seemingly wherever the Romans pitched their camps. The ancient gold and silver coins are in a very fair state of preservation.

The following gold, silver and minor coins are in current use in the United States:

GOLD COINS.

Double Eagles—Authorized to be coined, act of March 3, 1849; weight 516 grains; fineness .900. Total amount coined to June 30, 1921, $2,451,867,120. Full legal tender.

Eagles—Authorized to be coined, act of April 2, 1792; weight 270 grains; fineness .916⅔; weight changed, act of June 28, 1834, to 258 grains; fineness changed, act of June 28, 1834, to .899225; fineness changed, act of June 18, 1837, to .900. Total amount coined to June 30, 1921, $517,979,850. Full legal tender.

Half-Eagles—Authorized to be coined, act of April 2, 1792; weight 135 grains; fineness, .916⅔; weight changed, act of June 28, 1834, to 129 grains; fineness changed, act of June 28, 1834, to .899225; fineness changed, act of January 18, 1837, to .900. Total amount coined to June 30, 1921, $391,249,345. Full legal tender.

Quarter-Eagles—Authorized to be coined, act of April 2, 1792; weight, 67.5 grains; fineness, .916⅔; weight changed, act of June 28, 1834, to 64.5 grains; fineness changed, act of June 28, 1834, to .899225; fineness changed, act of June 18, 1837, to .900. Total amount coined to June 30, 1921, $44,641,475. Full legal tender.

SILVER COINS.

Dollar—Authorized to be coined, act of April 2, 1792; weight, 416 grains; fineness, .8924; weight changed, act of January 18, 1837, to 412½ grains; fineness changed, act of January 18, 1837, to .900; coinage discontinued, act of February 12, 1873. Total amount coined to February 12, 1873, $8,031,238. Coinage reauthorized, act of February 28, 1878; coinage discontinued after July 1, 1891, except for certain purposes, act of July 14, 1890. Amount coined to June 30, 1921, $597,346,848. Full legal tender except when otherwise provided in the contract.

Half-Dollar—Authorized to be coined, act of April 2, 1792; weight, 208 grains; fineness, .8924; weight changed, act of January 18, 1837, to 206¼ grains; fineness changed, act of January 18, 1837, to .900; weight changed, act of February 21, 1853, to 192 grains; weight changed, act of February 12, 1873, to 12½ grams, or 192.9 grains. Total amount coined to June 30, 1921, $221,708,656. Legal tender, $10.

Quarter-Dollar—Authorized to be coined, act of April 2, 1792; weight, 104 grains; fineness, .8924; weight changed, act of January 18, 1837, to 103⅛ grains; fineness changed, act of January 18, 1837, to .900; weight changed, act of February 21, 1853, to 96 grains; weight changed, act of February 12, 1873, to 6¼ grams, or 96.45 grains. Total amount coined to June 30, 1921, $137,939,639.50. Legal tender, $10.

Dime—Authorized to be coined, act of April 2, 1792; weight, 41.6 grains; fineness, .8924; weight changed, act of January 18, 1837, to 41¼ grains; fineness changed, act of January 18, 1837, to .900; weight changed, act of February 21, 1853, to 38.4 grains; weight changed, act of February 12, 1873, to 2½ grams, or 38.58 grains. Total amount coined to June 30, 1921, $212,010,879.70. Legal tender, $10.

MINOR COINS.

Five-Cent (nickel)—Authorized to be coined, act of May 16, 1866; weight, 77.16 grains; composed of 75 per cent copper and 25 per cent nickel. Total amount coined to June 30, 1921, $61,540,483.10. Legal tender for $1, but reduced to 25 cents by act of February 12, 1873.

Cent (copper)—Authorized to be coined, act of April 2, 1792; weight, 264 grains; weight changed, act of January 14, 1793, to 208 grains; weight changed, by proclamation of the President, January 26, 1796, in conformity with act of March 3, 1795, to 168 grains; coinage discontinued, act of February 21, 1857. Total amount coined, $1,562,887.44.

Below is given the list of special or out-of-date coins issued from the United States Mint from 1792 to 1921:

GOLD.

Fifty Dollar Piece, Panama-Pacific International Exposition—Authorized January 16, 1915; weight, 1,290 grains; fineness, .900; total amount coined to June 30, 1921, $150,950.

Quarter-Eagle, Panama-Pacific International Exposition—Authorized January 16, 1915; weight, 64.5 grains; fineness, .900; total amount coined, $25,042.50.

Three-Dollar Piece—Authorized to be coined, act of February 21, 1853; weight, 77.4 grains; fineness, .900; coinage discontinued, act of September 26, 1890. Total amount coined, $1,619,376. Full legal tender.

One Dollar—Authorized to be coined, act of March 3, 1849; weight, 25.8 grains; fineness,

.900; coinage discontinued, act of September 26, 1890. Total amount coined, $19,499,337. Full legal tender.

One Dollar, Louisiana Purchase Exposition—Authorized June 28, 1902; weight, 25.8 grains; fineness, .900. Total amount coined, $250,000.

One Dollar, Lewis and Clark Exposition—Authorized April 13, 1904; weight, 25.8 grains; fineness, .900. Total amount coined, $60,000.

One Dollar, Panama-Pacific International Exposition—Authorized January 16, 1915; weight, 25.8 grains; fineness, .900; total amount coined, $25.034.

One Dollar, McKinley Memorial—Authorized February 23, 1916; weight, 25.8; fineness, .900; total coined, $30,040.

SILVER COINS.

Trade Dollar—Authorized to be coined, act of February 12, 1873; weight, 420 grains; fineness, .900; legal tender limited to $5, act of June 22, 1874 (rev. stat.); coinage limited to export demand and legal tender quality repealed, joint resolution, July 22, 1876; coinage discontinued, act of February 19, 1887. Total amount coined, $35,965,924.

Lafayette Souvenir Dollar—Authorized by act of March 3, 1899; weight, 412½ grains; fineness, .900. Total amount coined, $50,000.

Columbian Half-Dollar—Authorized to be coined, act of August 5, 1892; weight, 192.9 grains; fineness, .900. Total amount coined, $2,500,000. Legal tender, $10.

Half-Dollar, Panama-Pacific International Exposition—Authorized January 16, 1915; weight, 192.9; fineness, .900; total amount coined, $30,000.

Half-Dollar, Illinois Centennial—Authorized to be coined, act of June 1, 1918; weight, 192.9 grains; fineness, .900; total amount coined, $50,029.

Half-Dollar, Maine Centennial—Authorized to be coined May 10, 1920; weight, 192.9; fineness, .900; total amount coined, $25,014.

Half-Dollar, Landing of Pilgrims Tercentennial—Authorized to be coined May 12, 1920; weight, 192.9; fineness, .900; total amount coined, $100,056.

Columbian Quarter-Dollar—Authorized to be coined, act of March 3, 1893; weight, 96.45 grains; fineness, .900. Total amount coined, $10,000. Legal tender, $10.

Twenty-Cent Piece—Authorized to be coined, act of March 3, 1875; weight, 5 grams, or 77.16 grains; fineness, .900; coinage prohibited, act of May 2, 1878. Total amount coined, $271,000.

Half-Dime—Authorized to be coined, act of April 2, 1792; weight, 20.8 grains; fineness, .8924; weight changed, act of January 18, 1837, to 20⅝ grains; fineness changed, act of January 18, 1837, to .900; weight changed, act of February 21, 1853, to 19.2 grains; coinage discontinued, act of February 12, 1873. Total amount coined, $4,880,219.40.

Three-Cent Piece—Authorized to be coined, act of March 3, 1851; weight, 12⅜ grains; fineness, .750; fineness changed, act of March 3, 1853, to .900; coinage discontinued, act of February 12, 1873. Total amount coined, $1,282,087.20.

MINOR COINS.

Three-Cent (*nickel*)—Authorized to be coined, act of March 3, 1865; weight, 30 grains; composed of 75 per cent copper and 25 per cent nickel. Total amount coined, $941,349.48. Legal tender for 60 cents, but reduced to 25 cents by act of February 12, 1873. Coinage discontinued, act of September 26, 1890.

Two-Cent (*bronze*)—Authorized to be coined, act of April 22, 1864; weight, 96 grains; composed of 95 per cent copper and 5 per cent tin and zinc. Coinage discontinued, act of February 12, 1873. Total amount coined, $912,020.

Cent (*nickel*)—Authorized to be coined, act of February 21, 1857; weight, 72 grains; composed of 88 per cent copper and 12 per cent nickel. Coinage discontinued, act of April 22, 1864. Total amount coined, $2,007,720.

Cent (*bronze*)—Authorized, act of April 22, 1864; weight, 48 grains; composed of 95 per cent copper and 5 per cent tin and zinc. Total amount coined to June 30, 1921, $39,926.11. Legal tender, 25 cents.

Half-Cent (*copper*)—Authorized to be coined, act of April 2, 1792; weight, 123 grains; weight changed, act of January 14, 1793, to 104 grains; weight changed by proclamation of the President, January 26, 1796, in conformity with act of March 3, 1795, to 84 grains; coinage discontinued, act of February 21, 1857. Total amount coined, $39,926.11.

TOTAL COINAGE.

Gold	$3,427,397,569.50
Silver	1,112,773,352.80
Minor	109,751,742.96
Total	$4,649,922,665.26

CANADIAN COINS.

In the days of French rule, French currency was used in Canada. When the British occupied the country in 1760, there was such a shortage of coins that they imported Spanish milled dollars, which they paid out at the rate of four shillings and six pence each. A standard coinage was not officially adopted by the Dominion government until 1871. In accordance with this act, Canada has the following coins: Gold, $10, $5; silver, 50 cents, 25 cents, 10 cents, 5 cents; nickel, 3 cents; bronze, 1 cent. A Newfoundland 20 cent silver piece is often mistaken for a Canadian coin. With the exception of the 5-cent piece, the Canadian coins are of approximately the same weight and fineness as those of the United States. In addition to these coins, the British sovereign is legal tender

at the rate of $4.86⅔, and American gold coins are legal tender for their face value. Formerly all Canadian coins were minted at the Royal Mint in London, but since 1908, when a branch mint was established at Ottawa, Canadian coins have been minted there.

Coke, the solid portion that remains after coal is subjected to intense heat. Coke is produced ordinarily in so-called coke ovens of the beehive type. One hundred bushels of coal are poured into the oven, which is then heated gradually to a temperature of 1400° C. As soon as the heat reaches 100° C. gas begins to escape; tarry products are given off up to 600° C. First class coke rings with a metallic sound and has a silvery luster. It is of much importance in melting metals, as it burns with a pure flame without gas or smoke, and, being pure carbon, gives a most intense heat. In some sections of the country, where coke is in great demand for iron furnaces, the gas and tar products are sold cheaply as by-products, or allowed to go to waste. In the sections remote from the iron regions coal is heated for illuminating gas, and coke is a by-product. Where there is a demand it is sold chiefly as fuel. It is not so easily kindled as coal, but is an excellent fuel for heat. Coal is expected to yield about sixty-five per cent of its own weight in coke. The latest statistics give 51,885,000 short tons as the total production of the United States. About half of this was made in Pennsylvania.

Coke, Edward (1552-1634), a noted English jurist. In the reigns of Elizabeth, James I, and Charles I, he was a lawyer of the crown. He conducted the prosecution against Sir Walter Raleigh, and was engaged in ferreting out the Gunpowder Plot. He was a rough sort of man, not without integrity. He fell into disrepute with the court of Charles for resisting the arbitrary acts of the king. His fame, however, rests on a large treatise in four parts on the law of England. Portions are still used as text books in the law schools of this country.

Colbert, kōl-bêr′, **Jean Baptiste** (1619-1683), a noted French financier. Under Louis XIV, he was for twenty-two years minister of finance. He found an empty treasury and the public revenues spent two years in advance, with fraud, disorder, and theft rampant. He reduced the rate of interest on the public debt, cut the rate of taxation in two, weeded out incapacity and dishonesty, increased the public income by $5,000,000, paid the enormous expense of two years of foreign war, and filled up the public treasury; yet he died out of favor with the king and his spendthrift court. During his management of the public purse, Colbert was liberal and enlightened in the encouragement of the fine arts and the sciences. At his suggestion the Academies of Sciences, of Architecture, and of Painting, the Royal Library, and the Garden of Plants, were given large grants of money. See NECKER.

Colby, Charles Carroll, (1827-1907), Canadian statesman, was born at Derby, Vt., and graduated from Dartmouth College in 1847. He was admitted to the bar in the Province of Quebec in 1847, but gave up law to engage in mining and industrial pursuits. In 1867 he was elected Conservative member for Stanstead in the House of Commons. From 1887 to 1889 he was Deputy Speaker of the House, and in 1889-91 was President of the Privy Council in the administration of Sir John A. Macdonald. During his long parliamentary term he became one of the ablest debaters in the House, and was one of the earliest advocates of the protective or national policy adopted in 1878. In 1886 he published *Parliamentary Government in Canada,* an authentic work on constitutional law. Charles William Colby, his eldest son (1867-), was professor of history in McGill University in (1895-1910) and published *The Sources of History.*

Colchicum, genus of plants of the family Liliaceae, native to Europe and the Mediterranean region. The species, of which there are about 30, are stemless, and the flowers, much resembling those of the crocus, are pale blue. This plant is very poisonous, due to the presence of colchicine, and cattle are frequently injured by it where it abounds. It is not difficult to eradicate, as when the plants are repeatedly

pulled up by the hand the roots become exhausted and die. The plant is used in medicine, principally the root and the seeds, the latter being round and brown, slightly larger than mustard, and fatal accidents have occurred through this resemblance.

Cold, a disordered state of the body, due either to infection or from exposure. It is usually a result of excessive evaporation from the skin by drafts of air, contraction of the blood vessels and other sympathetic disturbances, all of which may produce congestion of some internal organ. When one feels the premonitory symptoms of a cold, namely, a general feeling of malaise accompanied by chills, it is wise to take prompt measures toward relief. This is best done by means of hot foot-baths, hot drinks, etc., which induce sweating and often check the trouble in the beginning. Colds are generally accompanied by pains in the muscles and joints and swelling of the mucous linings of the throat and nose, accompanied by discharges. Fever and chills may occur, and generally there is a marked indisposition of the whole system. A cold should never be neglected, especially in the first months of the year, for it may lead to la grippe, followed by bronchitis or pneumonia.

Cold Harbor, Battle of. A bloody battle of the Civil War, fought June 1-3, 1864, at Cold Harbor, Va., about 10 miles northeast of Richmond, between the Federal Army of the Potomac, numbering about 102,000, under General Grant, and the Confederates of Northern Virginia, numbering about 65,000, under command of General Lee. On May 31, General Sheridan with his cavalry carried a position known as Old Cold Harbor, holding it against the fierce attacks of Fitzhugh Lee. On the succeeding days successive attacks were made by the Federal Generals Wright and W. F. Smith, all Confederate positions being stubbornly defended. Early in the morning of the 3d of June the Union army made a terrific assault on the Confederate army, being driven back in less than 30 minutes with heavy losses. The fighting ceased within an hour, without the Federals gaining much headway, but the killed, wounded and missing numbered fully 7,000. The loss of the Confederates is not exactly known. The total loss of the Federals during the whole period that this battle raged totalled fully 12,700 while that of the Confederates probably did not exceed 2,500. Military critics have agreed that this assault was the great mistake of Grant's career.

Cold Storage, a method of preserving perishable goods, such as fruit, dairy products, eggs, and meats, by storing them in a warehouse in which the air is kept at a low temperature by artificial means. The underlying principle to which cold storage owes its success is the important fact that bacteria cannot work in the cold, and that in consequence decay and putrefaction cannot take place in a cold room. Milk and butter keep well surrounded by the water of a cool spring. A cool cellar has a preservative influence. A refrigerator kept cool by the use of ice is a household convenience, especially in the city. A commodious refrigerator has become a necessity to the hotelkeeper. The butcher and the grocer must now provide large refrigerators for the perishable portion of their wares.

Cold storage warehouses are refrigerators on a large scale. Some are cooled by ice, but the immense cold storage plants that have sprung up of late are cooled by means of ammonia without the use of an ounce of natural ice. The reader may have noticed on a hot day that a little water sprinkled on the floor cools off a room delightfully. This is due to the fact that in evaporating or drying up, as the water on the floor quickly does, a great amount of heat is taken from the air of the room, leaving it cool. On somewhat the same principle ammonia is used to produce frost in a cold storage warehouse. It is evaporated in a system of pipes through the center of which run inner pipes containing a brine made of calcium chloride and water which becomes intensely cold without freezing. That is to say, the pipe of brine is surrounded by a larger pipe in which ammonia is evaporated, with the result of taking the heat out of the brine, and leaving it intensely cold like

that in an ice cream freezer. The cold brine is forced through a second system of pipes somewhat like a steam heating system, suspended usually on the walls, or to the posts that support the floors of the various rooms of the warehouse. By governing the flow of brine, a room may be chilled simply, or it may be made so cold, even on a hot midsummer day, that its contents freeze solid. Both the brine and the ammonia are used over and over, like the steam in a heating plant. In an efficient plant or system, a ton of coal will furnish the power requisite to produce a cooling effect equivalent to that of from eight to fourteen tons of ice. Ice cannot be handled so efficiently nor so economically, to say nothing of the economy of space and the neatness of the ammonia process. The capacity of an ammonia refrigerating machine is stated in terms of which the cooling influence of a ton of ice is the unit. A five hundred ton machine, such as is used in connection with large breweries and packing houses, is a plant whose cooling capacity may be represented as equal to the effect that might be obtained by bringing 500 tons of ice into the building daily.

Poultry, fish, and game may be frozen solid, in which condition they will keep sound for an indefinite period. Ordinarily meats are kept at or near the freezing temperature. Fruits are placed in a cold, but not freezing room. Eggs are kept fresh in cold storage from two to six months, but it is difficult to keep them from spoiling on account of moisture. Butter keeps well, but must not be frozen. It requires pure air or it will taint.

Cold storage is one of the most satisfactory means of keeping furs. Insects, especially moths, cannot work in the cold. Most large cities now have cold fur storage rooms in which furs may be hung up on hooks and checked till wanted.

Refrigerated cars and ships are now used on a large scale for the transportation of perishable articles. The fruit and vegetable centers of California and the South send their products to market in ice-cooled cars which are refilled with ice by the railway companies at regular stopping places. In the summer season refrigerated cars make regular trips of once a week and upward over nearly all lines of railroad, delivering fresh meats and fruits, and collecting eggs and dairy products. The butcher, grocer, and local merchant regulate their orders and shipments accordingly. The meat raisers of Argentina send their products to European markets in refrigerated ships. A storage house at Dubuque, Iowa, belonging to the Fruit Dispatch Co., is cooled by four miles of pipes. It is capable of receiving a banana train of forty-four cars. The cars stand on track in hot weather and are cooled off after their hot journey from the Gulf. In midwinter the same plant is used to warm up the cars and their contents. About 3,000 cars or $2,000,000 worth of bananas are sheltered in this warehouse yearly.

The transportation and preservation of perishable produce has become one of the most serious problems which can engage the attention of engineers and others interested in the efficacious and rapid dispatch of foodstuffs from one part of the world to the other. Statistics and statements from high authorities go to show that the transport and preservation of perishable produce is an enormous and growing business, and likely in the future to be one of the most important in the world.

In spite of the careful fostering of home industries intended to provide the food supply of the United Kingdom, the imports of provisions are regularly increasing. Instead of drawing on near-by countries, the English people are looking more and more to their colonies in distant parts of the world for these supplies. This is made possible by the present methods of refrigeration.

There are 358 ships engaged in the trade of the United Kingdom that are fitted in part or throughout with a total refrigerating capacity of 36,266,000 cubic feet. Of this number, 71 ships, with a capacity of 3,341,000 cubic feet for perishable produce, bring supplies from the United States; from Australia and New Zealand, 92 ships, with 15,514,000 cubic feet cold-storage capacity, bring chiefly beef, mutton, and butter; from Canada come 47 ships, with 1,829,000 cubic feet capacity, chiefly with meats and dairy products. The number of ships coming from South America carrying refrigerated cargo is not given, but their capacity for this class of goods is placed at 7,611,000 cubic feet.

The port of London is at the head of the list in the number of vessels and their carrying capacity, and takes most of the Australian and New Zealand cargoes, while Liverpool is second and takes most of the North and South American cargoes. However, the shorter trips of the Liverpool steamers bring the yearly sail-

ings and capacity as high or higher than those of London.

As the large quantities of foodstuffs arriving in this country can not be distributed direct to consumers, cold-storage warehouses have increased at the various seaports, in large centers of population, and at the principal distributing markets. The approximate refrigerating capacity of these warehouses in the principal towns varies from that of London, 9,000,000 cubic feet, to that of Hull, 250,000 cubic feet. The total capacity of these warehouses is not far from 23,000,000 cubic feet.

Mechanical refrigeration is now employed in dwelling and apartment houses, to supersede the icebox in the preservation or chilling of food and beverages; also for cooling the atmosphere of auditoriums, hospitals, etc., during hot weather; for certain engineering operations, and manufacturing processes requiring a temperature below that of the atsmosphere.

Coleridge, cōl′rij, **Samuel Taylor** (1772-1834), an English poet. He was a clergyman's son, and, from his earliest years, a great reader. He admired *Robinson Crusoe, The Arabian Nights*, and other tales of adventure. Orphaned in his ninth year, he was sent to London, where he became a "blue-coat boy" at Christ's Hospital. He seems to have been a precocious lad, who "read right through the catalogue" of a library to which a chance acquaintance had subscribed for him, but who looked with contempt upon his duller comrades. While other boys played football, he loved to dream or watch the drifting clouds. As he grew older, he would discourse occasionally to his mates in the cloisters of the school, or recite Homer in the original Greek, holding them spellbound by his wonderful voice and intonation.

At nineteen he went to Cambridge, but getting into debt carelessly in his second year, he ran away from college and joined a regiment of dragoons. He soon regretted this step, and was bought out of the army by his friends. He returned to college, where he adopted Unitarian and democratic views. He became absorbed in visionary schemes, one of which was to found a model colony on the banks of the Susquehanna. He left college without taking a degree, and began writing prose and verse for the magazines. He became closely associated with Southey and Wordsworth, the three comprising the "Lake School" of poets. Coleridge married early, but with insufficient means. Thereafter he received assistance frequently from his friends. Finally, he weakly deserted the wife and children he could not support, and Southey, who had married Mrs. Coleridge's sister, took them under his care.

For fifteen years Coleridge was a slave to the opium habit, begun by taking the drug in time of illness. Such habit may in large measure account for the failure to fulfill the great promise of his youth. His genius was many sided, but, whatever path he entered, a weak will and a vacillating purpose prevented arrival at the goal. After a severe struggle, and by the aid of a devoted physician, the habit was overcome. During the years left to him Coleridge devoted his time to philosophy and criticism.

Coleridge's personal magnetism, his powerful, if ill-balanced mind, his remarkable gift as a talker, won him many friends. That his faults and failures call for pity more than blame may be inferred from the fact that these friends continued to love and honor him. He seemed to write under sudden inspiration, and, if interrupted, was often utterly unable to complete what he had begun. He said of himself: "The author has frequently purposed to finish for himself what had been originally, as it were, given to him; but the tomorrow is yet to come."

Coleridge's influence on the opinion of the day was prodigious. To his friends, Wordsworth, Southey, and Lamb, his companionship seemed to act as a spur to better work, while Hazlitt, Scott, Poe, Lowell, and many others acknowledge a great debt.

His most important poetical work was done in the year 1798. *The Ancient Mariner, Christabel, Ode to France, Kubla Khan,* and other poems were produced at this time. As he never equalled this work at any other period of his life, this year is called Coleridge's *annus mirabilis,* or wonderful year.

The origin of *The Rime of the Ancient Mariner* is of interest. The two friends, Wordsworth and Coleridge, started on a

walking tour. As they had little money, it was suggested that they produce conjointly a poem for the *New Monthly Magazine,* the proceeds to defray the expense of the trip. On a previous occasion they had planned to publish a volume of verses for which Coleridge was to furnish poems whose incidents and scenes should be in part supernatural, but which should aim to depict faithfully the actual emotions which would be felt should such incidents and scenes be true. They now planned *The Ancient Mariner* to be constructed along these lines. Coleridge told of a dream related by a friend. Wordsworth added a few hints—suggested some lines. That same evening he withdrew from the endeavor. He has himself said, "Our respective manners proved so widely different that it would have been quite presumptuous in me to do anything but separate from an undertaking upon which I could only have been a clog." The poem thus begun in November, 1797, was completed in March following, and was published in *Lyrical Ballads* during the summer. Wordsworth contributed most of the other poems to the volume. *The Ancient Mariner* was most harshly criticized at its appearance, Wordsworth himself attributing to it the failure of the *Lyrical Ballads.* None of Coleridge's friends realized that he had produced an immortal poem.

The tale is wholly imaginative, but the genius of the poet produces the impression of vivid reality. There is something weird in the very opening of the poem. The Mariner stops a man about to attend a wedding and "holds him with his glittering eye," while he relates his story. The wedding guest hears occasionally the music and merriment of the feast; but he cannot leave the old sailor, who is constrained by a "woeful agony" to recount his sin and suffering. The tale is of a ship sailing into southern seas, driven to cross the line by storms, and caught in the ice of the Antarctic regions. An albatross appears, and is welcomed as a bird of good omen. The ice splits and the breeze helps them northward. But the mariner shoots the albatross on a sudden impulse, and woe follows the cruel deed. The ship enters the Pacific Ocean and is becalmed. The dead bird is hung about the sailor's neck by his companions, as a penance for his crime. There is no water to drink and the crew perish of thirst. Then a phantom ship appears, on whose deck Death and Life-in-Death throw dice for the soul of the wretched mariner. Life-in-Death wins. The mariner sees the souls of the dead men leave their bodies; he endures the awful loneliness of the wide ocean; he sees "the curse in a dead man's eye." At last, in an instant of self forgetfulness, he blesses the happy creatures of the deep—the water snakes that play about the ship. That moment the spell begins to break. Sleep refreshes him and there is an element of hope in all that follows. At last he beholds his native land; but he is ever after constrained to wander from place to place, and teach by his tale the lesson of love for all life.

> That moment that his face I see,
> I know the man that must hear me
> To him my tale I teach.

The unusual setting of the story, as well as the ballad meter, simple but artistic, are admirably suited to make impressive the supernatural element introduced into the poem, which would be grotesque, were it less realistic. We must regard the albatross as the keynote of the tale. Six of the seven parts into which the poem is divided end with some reference to this bird.

The versification is varied; the words and phrases felicitous; the melody of the stanzas unsurpassed; while the imagery is so vivid that what we remember seems to be the pictures we have seen, rather than the events that have been narrated.

The following extracts give some idea of this power:

> And we did speak only to break
> The silence of the sea!
>
> As idle as a painted ship
> Upon a painted ocean.
>
> Water, water, everywhere,
> Nor any drop to drink.
> The Sun's rim dips; the stars rush out:
> At one stride comes the dark.

The moving moon went up the sky,
And nowhere did abide:
Softly she was going up,
And a star or two beside—

It ceased; yet still the sails made on
A pleasant noise till noon,
A noise like of a hidden brook
In the leafy month of June,
That to the sleeping woods all night
Singeth a quiet tune.

QUOTATIONS.

Och Clo.—The other day I was what you would call *floored* by a Jew. He passed me several times, crying for old clothes in the most vocal and extraordinary tone I ever heard. At last I was so provoked, that I said to him, "Pray, why can't you say, 'old clothes' in a plain way as I do now?" The Jew stopped, and looking very gravely at me, said in a clear and even fine accent, "Sir, I can say old clothes as well as you can; but if you had to say so ten times a minute, for an hour together, you would say *Och Clo* as I do now;" and so he marched off. I was so confounded with the justice of his retort, that I followed and gave him a shilling, the only one I had.—Coleridge, *Table Talk*.

Doing an evil to avoid an evil cannot be good.

Greatness and goodness are not means but ends.

A dwarf sees farther than a giant when he has the giant's shoulders to mount on.

I wish our clever young poets would remember my homely definitions of prose and poetry; that is, prose,—words in their best order; poetry,—the best words in their best order.

CRITICISMS.

Coleridge suffered an almost lifelong punishment for his errors, whilst the world at large has the unwithering fruits of his labors and his genius and his sufferings.—De Quincey.

The largest and most spacious intellect, the subtlest and most comprehensive, that has yet existed among men.—De Quincey.

To the man himself Nature had given, in high measure, the seeds of a noble endowment; and to unfold it had been forbidden him.—Carlyle.

The most wonderful man I ever knew was Coleridge.—Wordsworth.

Colfax, Schuyler (1823-1885), an American statesman, was born in New York City, but removed to Indiana in 1836, where he studied for, and was admitted to, the bar. As editor of the South Bend *Register,* Mr. Colfax first won recognition as a political figure. Elected to Congress in 1854, he served seven consecutive terms, and was Speaker of the House from 1863 to 1869. From the latter year until 1873 he was Vice-President of the United States. Mr. Colfax was active in the reform of the postal system but he was accused of postal frauds. During the Credit Mobilier scandal other charges were brought against him. None of the charges were proved.

Colic, a spasmodic pain in the abdomen dependent upon the irregular contractions of the muscular coat of the intestines. The word is from the same root as is colon, a name used to designate the large intestine. Colic is a symptom rather than a disease. Its causes are various, the most common being irritation resulting from undigested food. Colic may, however, be of a neuralgic character, caused by cold, it may be the result of poison, or it may be the symptom of some affection of the kidneys or bladder. The first remedy for ordinary colic is warmth applied externally. Hot drinks are a relief oftentimes and a full dose of some aperient is indicated.

Colic in infants is very common, often regarded as a necessary accompaniment of infancy. This, however, is not the case. No baby should be allowed to suffer from colic. If he be kept warm and clean, fed regularly, never allowed to suck in air instead of milk from his bottle or spoon and still cries often with colic, there is something wrong with the quality or quantity of his food. No medicine of any sort should be given him, but an experienced physician should be summoned and his advice followed in feeding the child.

Coligni, ko-lēn-yē′, **Gaspard de** (1517-1572), a French admiral. His life fell in the troublous times of the civil war between the Protestant Huguenots and the Catholics. A brilliant career in the wars with Spain raised him to the rank of admiral. He became the leader of the Huguenot party. In an age of the foulest treachery and assassination, and the concealment of ambitious designs behind the veil of religion, Coligni appears to have been the one eminent man of character. Catharine de Medici favored the admiral until she found that he had more influence with her son, King Charles IX, than she relished. She then incited the weak king to authorize a wholesale massacre of all Huguenots on the night of St. Bartholomew. At the appointed hour, when the

Paris mob fell upon the unsuspecting Huguenots, the Duke of Guise, leader of the Catholic party, hurried with armed men to the house of the aged admiral. His followers burst into Coligni's bedchamber, thrust him through with their swords, and threw his body out of an upper window into the street below. In 1562 a Huguenot colony under encouragement from Coligni founded the first white colony on the mainland of North America at Port Royal, South Carolina. The settlers named the country Carolina in honor of the same miserable Charles IX, but they lost the fort and supplies by fire and returned to France. See HUGUENOTS; CATHARINE DE MEDICI; MASSACRE OF ST. BARTHOLOMEW.

Coliseum, also **Colosseum,** one of the famous buildings of ancient Rome. It is also called the Flavian Amphitheater. It was begun by the Emperor Vespasian and finished by Domitian. It is an immense stone structure, oval in shape, surrounding a central arena in which wild beast shows, games, and gladiatoral contests were held. The vast structure covered six acres. It rested on four-score arches. The walls rose 140 feet. They were encrusted with marble and ornamented with four successive orders of columns. Within, marble seats covered with cushions rose tier after tier, capable of seating 80,000 spectators. The dens of the wild beasts were in the basement. The Coliseum was opened to the public during the reign of Titus. Five thousand lions and other wild beasts were slain in the arena during opening games which lasted one hundred days. It is said that during the persecutions of the Christains, entire families were forced into the arena. Wild beasts, purposely left without food for several days, were then introduced, that the spectators might witness the cruel sport of seeing them chase and devour human beings, as cats do mice. Many of the marble seats have been removed for building material, and a portion of the walls has fallen, but enough still remains to give an idea of former magnificence. See AMPHITHEATER.

While stands the Coliseum, Rome shall stand;
When falls the Coliseum, Rome shall fall;
And when Rome falls—the world.
—Byron, *Childe Harold's Pilgrimage.*

The following admirable description of the amphitheatre and its sports is from Gibbon: "The hunting, or exhibition of wild beasts, was conducted with a magnificence suitable to a people who styled themselves the masters of the world; nor was the edifice appropriated to that entertainment less expressive of Roman greatness. Posterity admires, and will long admire, the awful remains of the amphitheatre of Titus, which so well deserved the epithet of colossal. It was a building of an elliptic figure, five hundred and sixty-four feet in length, and four hundred and sixty-seven in breadth, founded on fourscore arches, and rising, with four successive orders of architecture, to the height of one hundred and forty feet. The outside of the edifice was encrusted with marble, and decorated with statues. The slopes of the vast concave which formed the inside were filled and surrounded with sixty or eighty rows of seats of marble, likewise covered with cushions, and capable of receiving with ease above fourscore thousand spectators. Sixty-four vomitories (for by that name the doors were very aptly distinguished) poured forth the immense [illegible] and the entrances, passages, and staircases, contrived with such exquisite skill, that each person, whether of the senatorial, the equestrian, or the plebeian order, arrived at his destined place without trouble or confusion. Nothing was omitted which in any respect could be subservient to the convenience or pleasure of the spectators. They were protected from the sun and rain by an ample canopy occasionally drawn over their heads. The air was continually refreshed by the playing of fountains, and profusely impregnated by the grateful scent of aromatics. In the centre of the edifice the arena, or stage, was strewed with the finest sand, and successively assumed the most different forms. At one moment it seemed to rise out of the earth like the garden of the Hesperides, and was afterwards broken into the rocks and caverns of Thrace. The subterraneous pipes conveyed an inexhaustible supply of water; and what had just before appeared a level plain might be suddenly converted into a wide lake, covered with armed vessels and replenished with the monsters of the deep. In the decorations of these scenes, the Roman emperors displayed their wealth and liberality; and we read on various occasions, that the whole furniture of the amphitheatre consisted either of silver, or of gold, or of amber. The poet who describes the games of Carinus, in the character of a shepherd attracted to the capital by the fame of their magnificence, affirms that the nets designed as a defense against the wild beasts were of gold wire; that the porticoes were gilded, and that the belt or circle which divided the several ranks of the spectators from each other, was studded with a precious mosaic of beautiful stones.

Collar, the neckband of a coat, cloak, gown, or other garment, either standing or rolled over. Separate bands or ruffs of muslin, linen, lace, or fur have been

THUMBS DOWN

From the Painting by J. L. Gerome

known for centuries. The detachable linen shirt collar is said to be an American invention, first made at Troy, New York. The manufacture of Troy collars was begun in 1829 by Ebenezer Brown. Detachable cuffs were made as early as 1845, and the "Troy Laundry" grew up as a collateral branch of business. At first the maker got on by cutting one collar at a time with a pair of scissors and making it by hand. Some of the steps in the advancement of the business that may be mentioned are the cutting of a pile of cloth of many thicknesses at one operation; the use of sewing machines for stitching; and the introduction of buttonhole machines. In recent years the custom of wearing detachable cuffs has not been much in vogue, and hence the detachable cuff industry has decreased greatly. See LAUNDRY.

Collateral, a term used in law to denote that which is supplemental or related to the principal thing under consideration, as that which is given as security in addition to a principal obligation and to denote persons descended from a common ancestor but not from one another. In the first sense, the term is frequently used to designate a pledge of stocks, bonds, etc., as evidence of obligation as distinguished from chattels. In the second sense, an uncle is a collateral relative to a nephew, since both are descended from a common ancestor. Collateral relatives are included in the term "heir," but lineal descendants take precedence in the execution of a will.

College, in educational usage a word of varied application but designating an institution of learning in advance of secondary schools. The word college is Latin and means a body of colleagues. The collegium of Rome was very like what we call now a corporation, and might exist for purposes of trade, religion, politics, etc. The name was applied at an early date to associations of teachers and students drawn together by common interests and common pursuits. Out of this has grown the modern application of the term, but as a result of differing conditions the institutions of learning to which the name is given vary greatly in different countries. Quite distinctive, and of special interest, are American colleges. The early colleges, of which Harvard was the first, were governed by corporations, or bodies of trustees who received their charters from the king. After the adoption of the American Constitution these charters were granted by legislative act. Up to the close of the Civil War the four years' course offered by most colleges, including many subjects now studied in secondary schools, consisted of a single set of prescribed studies leading to one degree, that of bachelor of arts. Today better preparatory schools have enabled colleges to advance their entrance requirements, and to offer several different courses and more extended curriculums. There has been a growing tendency to increase the number of elective studies also. The greater number of colleges grant the degrees of bachelor of science and bachelor of literature, as well as that of bachelor of arts. Some also grant the master's degree for additional work.

There are a few state colleges whose income is derived from taxation. The majority of our colleges, however, are private corporations relying on endowments, many being under the auspices of some religious denomination.

See UNIVERSITY; OXFORD; SECONDARY SCHOOLS.

Collie. See DOG.

Collier, Jeremy (1650-1726), an English bishop. Collier was known in his own time as a bold political writer, but the work whose influence was greatest and has been most lasting was entitled *A Short View of the Immorality and Profaneness of the English Stage.* This pamphlet was an attack upon the writings of Wycherley, Congreve, Dryden, and others. It was the first step in the purification, not only of the drama, but of all lighter literature. Written with both wit and force, it was widely read, and received the support of the moral and thoughtful, although it met, naturally enough, with opposition. Dryden himself gracefully acknowledged its justice.

> I shall say less of Mr. Collier, because in many things he has taxed me justly; and I have pleaded guilty to all thoughts and expressions of mine which can be truly argued of obscenity,

profaneness, or immorality, and retract them. If he be my enemy, let him triumph; if he be my friend, as I have given him no personal occasion to be otherwise, he will be glad of my repentance.—Dryden *Preface to Fables.*

Collingwood, a town in Simcoe County, Ontario, on the southeast shore of Georgian Bay. It has one of the best protected harbors on the Great Lakes, and one of the largest shipyards and dry docks in the British Empire. Its position as a terminal of a branch of the Grand Trunk Railway has made it an important shipping and trading center. Among its chief manufactured products are wire nails and fencing, brooms, canned fruits and vegetables, knitted goods, and machine shop products. Collingwood claims to have the largest fruit and vegetable garden in Canada. Collingwood was named for the famous admiral, Lord Cuthbert Collingwood (1750-1810), who was Nelson's second in command at Trafalgar. Population, 1921, 5,882.

Collins, William Wilkie (1824-1889), a London novelist. His father was a landscape painter of good repute. The son studied law, but wrote stories. *The Moonstone* is perhaps the best. *Armadale, A New Magdalen, The Woman in White,* and *The Dead Secret,* are others which have been very popular. Several of these were published in American magazines before appearing in book form, and it is said brought their author immense sums of money. Few novelists have enjoyed a wider popularity in their own day than did Collins. His novels can never be regarded as great, however. He lacks the power of making fiction appear as reality. His characters are often unnatural and seem more like actors playing their parts on a stage than like live men and women. For skill in inventing and elaborating intricate plots, Collins was unequalled. He evolved a new type of novel-mystery stories.

Collodion. See CELLULOSE.

Colocynth, a plant of the squash or gourd family. It is known also as coloquintida, bitter apple, and, by botanists, as *Cucumis Colocynthis.* The plant springs from a perennial root. It is a violent purgative. It is imported dried and peeled from Turkey and is usually mixed with other ingredients. Colocynth, mixed with aloes, scamony, cardamon seeds and soap forms a compound extract and is a valuable purgative. In large doses colocynth is an irritant poison. The commercial article is obtained from Spain and Asia Minor, and it is also found in Greece, Ceylon and India.

Cologne, kō-lōn′, the largest city on the Rhine. It is situated on the west bank of the river in the province of Prussia. The site is about 130 feet above the sea level. Ancient walls in the form of a crescent, with the two ends resting on the river, have been leveled and turned into a series of fine boulevards. A series of fortifications has been constructed in a similar semicircle a little farther out, making Cologne one of the most strongly fortified places in the German Empire. Its principal suburb lies on the east bank of the river, with which it is connected by a long iron bridge, forty-seven feet above the surface of the river, carrying both railroad trains and ordinary traffic. The river is also crossed by means of an interesting bridge of boats. This bridge rests on boats anchored in the stream. The boats in a central section of the bridge are provided with engines and paddle wheels. When a raft of timber from the Black Forest, or a steamer, desires to pass, this section of the bridge is detached and steams out of the way. When the river is clear, it returns and is locked in place, permitting the resumption of traffic.

The city is of ancient origin. When first known it was a town of the Ubii, a German tribe. About 51 A. D. it became a colony or colonia of the Romans, whence its name. During the Middle Ages it was one of the most influential and wealthy cities of the Hanseatic League, carrying on an immense trade with England in wheat, wine, and beer. It was celebrated at an early date for manufactures, still maintained on an extensive scale. Sugar, confectionery, tobacco, malt liquors, mineral waters, vinegar, candles, starch, soap, woolen goods, and the celebrated perfume known as eau de cologne, or Cologne water, are specialties. These give the city a high commercial standing.

The archbishop of Cologne was one of the seven electors who were privileged to select the head of the Holy Roman Empire, the theoretical successors of Charlemagne. A museum of antiquities contains a vast number of drawings, gems, carvings, remains of sculpture, coins, specimens of pottery, and stained glass, dating from the Middle Ages. The town hall in which the merchants of the Hanseatic League used to meet is one of the most interesting in Europe.

Several churches would attract attention, were it not for the Cologne Cathedral, the pride of the city, the greatest Gothic edifice in Europe. The general plan is an imitation of that of Amiens, France. It is built in the form of a cross. The top or front end, called the choir, lies toward the river. The nave or long part extends to the west. This cathedral takes the place of older edifices. The cornerstone was laid in August, 1248. The last capstone was set in place August, 1880, 632 years later. For centuries, 1447 to 1823, no progress was made. The entire edifice is built of light colored stone brought down the Rhine from a quarry on the Drachenfels. The choir was built first. The greater part of the building was erected during the nineteenth century, at an expense of $4,500,000. The total length is 444 feet; breadth of nave, 201 feet; length of transept—the cross portion—282 feet. The main walls are 150 feet high; the height of the roof is 201 feet; the central tower is 357 feet high. The towers that flank the west entrance are 512 feet high, the loftiest in Europe. Seen from a distance this enormous mass of masonry looms up against the sky in a clear cut outline. Seen nearer, it is enlivened by a wealth of flying buttresses, turrets, gargoyles, galleries, cornices, and foliage that give the edifice an air of grace and beauty almost incredible. It is difficult to believe that stone work capable of withstanding the storms of centuries can be made to seem so airy and delicate. The principal portal or doorway is 98 feet high, and 31 feet in width. It is surrounded by statuary. Though of enormous size, the portal seems no more than appropriate for so magnificent a building. The interior is supported by 56 pillars, the largest of which are ten feet in diameter. The choir is surrounded by seven chapels. The windows are glazed with stained glass, representing Biblical subjects. The cathedral bell, weighing twenty-six tons, was cast from cannon captured from the French.

The city is growing rapidly. Population, 1921, 516,527.

See RHINE; CATHEDRAL.

Colombia, the most northwesterly country of South America. Its neighbors are Venezuela, Brazil, Peru, Ecuador, and the new state of Panama. The government is republican. The boundaries are in dispute on all sides. The area is estimated at 440-846 square miles, or about ten times that of New York. Bogota, the capital, is the largest city of importance, It is situated in the interior, on a lofty tableland, about 200 miles from the Pacific coast and about 300 miles from the Caribbean Sea. It is 9,000 feet above the sea and is said to have a climate as delightful as Vermont in September. It is said to be the most beautiful city in South America.

There are 891 miles of railroad, reinforced by over 14,000 miles of telegraph lines, all owned by the government. There are numerous lines of steamers on the Magdalena River. Barranquilla, at its mouth, is the chief port and town. The population of Colombia in 1918 was about 5,855,077, including 160,436 uncivilized Indians, and perhaps half as many negroes, the latter chiefly on the coast. The language of the schools and of society is Spanish. The influential element is of Spanish descent. The religion is Roman Catholic, but other forms are permitted.

Generally speaking, the country is mountainous. The ranges of the Andes run north and south with intervening valleys. A vast territory of level land lies on the southeast of the Andes, about the head waters of the Rio Negro. Generally speaking, the country is not well opened up. The mineral possibilities are great. There are thirty-two emerald mines, and unknown treasures of gold, silver, platinum, copper, lead, mercury, iron, coal, petroleum, salt, and building stone. Co-

coa, tobacco, vegetable ivory, coffee, dye woods, rubber, vanilla, silver, hides, meats, bananas, and tolu are exported in considerable quantities. The merchants of the United States sell Colombia about $13,000,000 worth of cotton cloth, flour, petroleum, and provisions, and buy an equal amount of the productions of that country. The trade with England amounts to about half. That of Germany and France is less. The metric system was introduced in 1857. Accounts are kept in the gold peso, worth about one dollar. United States money circulates freely.

STATISTICS. The following statistics are from trustworthy sources:

Area, square miles	440,846
Population (1918)	5,855,077
Indians	160,436
Chief cities:	
Bogota (estimated 1921)	160,000
Mendellin (1918)	79,146
Barranquilla (1918)	64,543
Cartagena (1918)	51,382
Number of departments	23
Members of senate	34
Members of house of representatives	92
National revenue	$22,229,581
Cotton, bales (500 lbs.)	5,500
Manufacturing establishments	121
Capital invested	$12,406,000
Pig iron, tons annually	10,950
Emeralds, value	$1,000,000
Imports	$90,000,000
Exports	$70,000,000
Gold exported, value	$123,681
Coffee exported, pounds	149,111,674
Miles of railway	891
Number of schools	5,453
Pupils enrolled	350,241

Colon, kō-lōn′. See PANAMA; PANAMA CANAL.

Colonies, the name now loosely applied to areas in one country held and governed by another country. Originally, a colony meant a group of people living in a foreign country for the purpose of cultivating the land and adding to the wealth of the mother country. The colonists of the ancient world were almost always governed by the laws of the parent land, while today the degrees of autonomy enjoyed by colonists vary widely. In its loose sense, the term colony is now applied to purely military posts as well as to states like Australia and Canada, which are practically autonomous.

GREECE AND ROME. The greatest colonizer among the ancient powers was Greece. Colonies were established by the Greeks in Asia Minor, Africa, the Crimea, Thrace, Italy, Sicily, and in Gaul. The present French city of Marseilles was originally a Greek colony. The causes of Greek colonization were chiefly two—political disturbances and overpopulation in the mother state. As a usual thing, Greek colonies were politically independent, the bond with the parent state being largely one of affection. If a Greek colony desired to found a colony of its own, it did so. The colonies of Phoenicia differed from those of Greece, in that the former were primarily commercial, serving as ports of repair and places of storage. Carthage, originally a Phoenician colony, became a colonizer almost rivaling Greece. The colonies of Rome differed from any of the others named; they were really only military posts. But the organizing genius of the Romans was great, and every Roman colony was finally made a part of the Empire.

PORTUGAL. Subsequently to the fall of Rome, colonization declined and all but disappeared, and was not revived until early in the fifteenth century, when the Portuguese took precedence of other countries as navigators and, concomitantly, as colonists. Later in that century, the Spaniards become strong rivals of the Portuguese. In 1419, the Portuguese discovered Madeira, the Azores and the Cape Verde Islands. Soon they had advanced to the Congo, had reached the Cape of Good Hope, and had landed on the Indian coast. The first colonies established by the Portuguese were only military garrisons. Reaching Brazil in 1499, the Portuguese established colonies there about four years later. But on account of misgovernment at home and the subjection of Portugal to Spanish rule, after a short time the Portuguese lost the greatest number of their colonies.

SPAIN. Before the fifteenth century was out, Spain had outstripped Portugal in the race for possessions. Columbus, in 1492, discovered San Salvador; in a short time the Spanish had colonized San Domingo, Jamaica, Porto Rico and Cuba; and before

1550 they had reached and subdued Mexico, Venezuela, Ecuador, Peru and Chile, and stood first in Europe as colonizers. The ever-backward Spaniards, however, made little or no attempt to develop the countries in their possession, and began losing or selling what they had gained.

HOLLAND. The Dutch were literally forced to become colonists. They had gained first place as marine carriers; but Phillip II barred the port of Lisbon to Dutch vessels, and they were under the necessity of getting goods directly from India or losing their trade. They formed numerous companies, therefore, and later amalgamated them into the East India Company, which had power over all Dutch conquests and colonies in India. Portugal soon lost to Holland her Eastern colonies. The Dutch colonized the West Indies and set up also at the Cape of Good Hope. But England's growing power and Holland's temporary loss of independence during the Napoleonic wars reduced her colonies very materially, and she has not regained her once favored position.

GREAT BRITAIN. The colonial empire of Great Britain originated in the discovery by British vessels in 1591 of a route to the East Indies. Colonization of North America was undertaken on a large scale in Elizabeth's reign; Australia was discovered in the early seventeenth century and penal colonies were established there; and the finding of gold in Victoria in the nineteenth century led to further Australian colonization. Cape Colony fell to the British in 1814, and other possessions in South Africa were soon acquired. Previously, however, Great Britain had acquired territory in other parts of Africa, as the Gold Coast, Sierre Leone, Gambia and the Niger Districts. Egypt, though nominally under Turkish dominion, was really controlled by the British after the completion of the Suez Canal, and is still only partially independent of the Empire. In the Atlantic and Pacific oceans, the Carribean Sea, and the Indian Ocean, British possessions multiplied and became as stepping stones from one continent to another during the period between the sixteenth and the twentieth centuries.

FRANCE. France began colonizing at a later date than did Britain, and has never been as successful as the latter. In 1763, the year of the signing of the Treaty of Paris, France lost her possessions in America, and French colonization was almost nil for the succeeding one hundred years. This quiet period was followed by a period of expansion in Africa and the Far East.

GERMANY. Germany's effort to become a colonial power and the disastrous result is known to everyone. Before the World War, Germany controlled several districts in Africa, together with a portion of New Guinea, the Bismark Archipelago, and some other island possessions.

UNITED STATES. The United States has never acquired nor attempted to acquire extensive possessions in other parts of the world. Aside from Porto Rico, the Philippine Islands, Hawaii, Alaska, the Virgin Islands, Guam, and American Samoa, the United States has no territorial possessions.

PRESENT STATUS. Since the World War, Great Britain and France hold more territory, under one or another kind of government, than they held in 1914. Germany has lost her territories. The colonies of the British Empire, self governing and other, have a total area of 8,732,731 square miles. India and its dependencies has an area of 1,802,629 square miles. Territory held by Britain under protectorates has an area of 1,967,096 square miles; small detached possessions measure 136,586 square miles; and the mandatories of the Empire, 972,-507 square miles. This vast land area seems even more vast when compared with the total area of the British Isles—121,633 square miles.

France, including Alsace-Lorraine, has a total area of only 212,659 square miles, yet the total area of French possessions is 5,123,019 square miles, of which 4,755,827 square miles are in Africa, and 321,886 square miles in Asia.

Colonization, in modern times, has added greatly to the complexity of international relations. Further colonial expansion on the part of one power is viewed with hostility by another; subject peoples, as the natives of India, demand independence of the ruling country and the demand is sec-

onded by rivals of the ruler; and world markets are eagerly sought by the powers. Upon consideration of these, the more obvious, facts, the inability to make positive assertions with regard to the future of colonies and colonizers becomes apparent.

See GREECE; ROME; PHOENICIA; PORTUGAL; SPAIN; NETHERLANDS; GREAT BRITAIN; FRANCE; UNITED STATES; DE GAMA; COLUMBUS; EAST INDIA COMPANY.

Color, in physics, a class of sensations made by light on the optic nerve. Light consists of transverse vibrations of so-called "ether." All the vibrations are inconceivably rapid and short, but they vary in rapidity and length. Sunlight consists of vibrations of all lengths. It creates the sensation known as white. Light falling on certain surfaces is wholly absorbed, none of it reaching the optic nerve. This sensation, or lack of sensation, is known as black. White and black are not regarded as colors. If white sunlight be caused to pass through a prism, the waves are sorted or grouped, or, better yet, arranged in order of shortness and frequency.

No doubt there are waves that are too short and too frequent to create a sensation on the nerve of the human eye. For aught we know, the eye of beast or insect or bird may experience delicate sensations of color unknown to man. However that may be, the shortest and most rapid waves known to the human eye are called violet rays. We are virtually certain that there are light waves too long, too slow, to excite the optic nerve. It may be that certain animals see light that our more delicate optic nerve cannot detect, but, be that as it may, the longest and slowest waves that are noticeable to the human eye are known as red waves.

Between the extremes of violet and red there may be an imperceptible graduation. The eye recognizes an almost infinite number of colors, shades, and tints, but seven seemingly distinct colors attract particular attention. If a ray of white light be decomposed by a prism into a band of colored light known as the color spectrum, the eye recognizes seven unmistakable colors — violet, indigo, blue, green, yellow, orange, and red. The initials of these spectrum colors spell *vibgyor*.

The seven colors of the spectrum are called popularly the primary colors, but the term is used otherwise by scientists. It has been found, for instance, that yellow of the spectrum may be resolved into red and green, and that spectral red and green, combined, form yellow. Spectral red, green, and violet cannot be resolved into other colors. They are called, therefore, the primary spectral colors. In the case of pigments—coloring materials—it is found that blue is a primary color. As we deal with pigment colors, rather than spectral colors, red, green, and blue are considered the primary colors.

If the primary colors of the spectrum be painted on a disk, a sector to each color, and the disk be rotated rapidly, the colors blend into a white or gray. Colors that blend to form white or gray are called complementary; thus the primary colors are complementary. The term is applied more frequently, however, to a pair of colors that blend to produce white or gray. Such pairs of spectral colors are red and green-blue, orange and blue, yellow and indigo-blue, green-yellow and violet. In mixing dyes, however, it is found that blue and yellow are complementary. A color darker than standard is called a shade; a color lighter than standard, a tint. Thus we have a standard blue, and a series of shades of blue, and a second series of tints of blue. At one time, it was held that an eye for color was distressed by placing any but complementary colors together. The modern milliner, however, claims that, by selecting the proper shades or tints, any colors may be combined without offending correct taste.

The analogy between harmony in color and harmony in music is close. The wave length of red is about double the wave length of violet. Color bears the relation to light that pitch bears to sound. Violet is an octave higher than red in the scale of colors. The visible colors comprise but an octave. The waves shorter than violet are known as ultra-violet; those longer than red are known as infra-red.

The entire scale from the lowest infra-red to the highest ultra-violet is perhaps seven light octaves.

The following table gives the standard wave lengths. The unit is the micron, or 1/1000 of a millimeter.

Ultra-violet (invisible)	.180000
Violet	.396800
Indigo	.429300
Blue	.486151
Light green	.527052
Yellow	.589618
Orange	.656307
Red	.688411
Dark red	.762131
Infra-red (invisible)	30.000000

As stated elsewhere, the list of colors is well nigh endless. Chapman's color chart for the identification of the plumage of birds contains thirty colors.

A red wall surface is a surface that absorbs all other rays and reflects red rays. A red pane of glass in a stained window is a pane that stops all other rays and allows the red rays to pass through. Green goggles stop all but green light, the color that is easiest on the eye. Wall papers should be chosen not only for harmony of color, but with reference to the demand for light. Yellow reflects three times as much light as dark brown. If a room be too light, vermilion and green and black will soften the glare; if a room or passage be deficient in light, yellows and white are to be preferred.

The power of various colors and surfaces to reflect light is shown in the following table, which gives the percentage of the total incident light that is reflected:

Mirror	95
White blotting paper	82
Chrome yellow	62
Orange	50
Yellow	40
Pink	36
Emerald green	18
Dark brown	13
Vermilion	12
Black paper	0.5
Deep chocolate	0.46
Black velvet	0.4

Students of nerve diseases have investigated the effect of color. The name of chromatography has been given to the new science based on the effect of color on the human body. It has been found that red is an excitant; that orange and yellow also excite, but in a less degree. Violet, indigo, and blue have a calming effect. Green excites a feeling of pleasure and then a sense of peace. According to the conclusions of the scientists, the various colors affect blonde people more than they do brunettes. Fleshy patients are more susceptible to the effects of colored lights than are spare patients. Nervous people should avoid living in rooms papered or draped with red. Violet, green, and blue are colors to be preferred.

See SMALLPOX; CANCER; LIGHT; FINSEN.

Color Blindness, a defect in vision, either an insensibility to color at all or an inability to recognize certain ones. Red blindness or green blindness are the most common, in either case those colors appearing as yellow. The explanation is that those portions of the retina which respond to the wave-lengths of certain colors are either absent or diseased. Continual straining of the eyes in the effort to distinguish red and green lights on the part of trainmen sometimes leads to insensibility to these colors. A careful series of tests with colored worsteds must be undergone by any one wishing to enter the railway service where the interpreting of signals is necessary. The discovery of color blindness is said to have been made by John Dalton, the famous chemist, who was himself a victim, which led to this defect being called Daltonism.

Colorado, a state of the American Union. It was admitted in 1876, and is known as the Centennial State. It lies four square, and is bounded by four straight lines. It is included between the 37th and 41st parallels. The eastern line follows the 102nd meridian, and the west line the 109th meridian. The northern boundary is shorter therefore than the southern boundary. Colorado and Wyoming are the only states in the Union that are bounded by four straight lines. The area is 103,948 square miles.

THE PLAIN REGION. The eastern third of the state, or that part east of the Rocky Mountains, is a part of the great treeless plain of North America. It is divided into

two sections. The northern part lies in the upper valley of the South Platte, the southern, in the valley of the Arkansas. The soil is fertile, but insufficiently supplied with moisture. Dust blanket cultivation has done much for the country. By means of irrigation the waters of the mountains have been utilized to convert large areas in the valleys into alfalfa meadows, beet fields and orchards, but the supply is limited. The state has but 290 square miles of water. Large areas are still waiting for man to devise a way of obtaining water, all that is needed to render them enormously productive. The lowest point in this section is 3,047 feet above sea level.

The Mountain Region. The western two-thirds of the state is in the heart of the Rocky Mountains. There are 300 peaks over 13,000 feet high, including the highest in the United States, if we except Mt. Whitney of California. One of the most noted is Pike's Peak, 75 miles south of Colorado Springs. The Main Rockies traverse the state from north to south in two lines or ranges that separate and approach again, inclosing great valleys shaped like links in a chain. Named from the north, they are North Park, Middle Park, South Park and San Luis Valley. South Park, the smallest of the four, is 8,000 feet high, and is as large as Rhode Island. In addition to these, there are many smaller parks to the westward, some of them as large as an ordinary Illinois county.

River Systems. Colorado shares honors with Wyoming and Minnesota as the source of the head waters of river systems. The Platte and the Arkansas have been mentioned. They carry the waters of eastern Colorado to the Mississippi. The waters of the western section go by way of the Colorado River, which rises in Grand County, through the Grand Canon in Arizona to the Gulf of California and the Pacific Ocean. San Luis Valley is drained by way of the Rio Grande into the Gulf of Mexico.

Scenery. Save for the plains in the eastern part of the state, Colorado is as rich in scenic beauty as any other state in the Union, and in this feature far surpasses the greater part of them. Forests and waterfalls, deep canons and lofty mountain peaks, quiet upland meadows and wild water-filled gorges—these and other natural beauties have been made accessible by the construction of railways and stage routes. The scenic wonders of the state, together with the salubriousness of the climate, have made it a popular resort for those who seek quiet and rest, and especially for those who seek relief from various diseases of the lungs. Two beautiful national parks—Rocky Mountain and Mesa Verde—and two marvelous national monuments—the Colorado and the Wheeler—with a total area of 316,589 acres, lie within the state.

Minerals. While the mineral resources of Colorado have always been a source of vast wealth, agriculture has supplanted mining as the leading industry. Colorado holds first place among the states in the production of radium and tungsten, and second place in the production of gold. As a coal producing state, Colorado has for many years held first place among the states west of the Mississippi River. Almost all the radium-bearing ore, carnotite, in the state is found in the Paradox Valley. This ore was for many years sent to Europe for reduction, but much of it is now smelted within the state. Colorado was looked to for some years as a potentially rich petroleum producer, but has since been eclipsed by other states in the production of this valuable commodity. The gold, silver, iron, lead and zinc mines of Colorado are of importance, though in the production of none of these is Colorado first among the states of the Union.

Agriculture. With the reclamation through irrigation of great reaches of land in Colorado, the state is rapidly increasing in importance as a producer of agricultural products. The most important crops are sugar beets, wheat, oats, corn, potatoes, alfalfa, melons, apples, timothy and clover, and barley. Colorado potatoes, melons and apples are particularly well known in the markets of the East. The raising of sugar beets has become especially important. Colorado, because it contains thousands of acres of land that are not available for tillage, pastures cattle and sheep in great

Gathering the Beet Crop

Harvesting Cantaloupes

Stacking Alfalfa

Irrigating the Crops

numbers; but as a stock-raiser the state was once of more importance than it now is. With the increase in the irrigated area, cereal, vegetable and fruit growing will become still more extensive in this state, but never to the total exclusion of stock-raising as a separate branch of agriculture.

MANUFACTURES. In the decade 1900-20 the manufacturing establishments in Colorado, because it contains thousands of increase is partially accounted for by the growth of the beet sugar industry, which is the leading factory industry of the state. As is to be expected in a state whose coal and iron resources are extensive, the manufacture of rails and other heavy steel mill products is important. Meat packing, flour and grist milling, and cheese and condensed milk making add much to the wealth of the state. The principal manufacturing center is Denver, with Pueblo, Colorado Springs, Greeley and Trinidad following.

EDUCATION. In the matter of funds for education, Colorado is particularly well favored. The state has a permanent school fund, derived from Federal land grants, of about $5,000,000, the income from which is equitably apportioned among the school districts. Sales and leases of school lands and the royalties on minerals increase the state funds. In the past ten years, high schools and institutions for higher education have increased very rapidly—more rapidly than elementary schools. A minimum salary law for teachers was passed in 1921, and a great degree of coordination has been effected among rural schools.

The state university, at Boulder, was incorporated in 1861, and was opened on its present basis in 1877. The university comprises the colleges of pharmacy, engineering, liberal arts, commerce and education, the schools of law and medicine, the graduate school, the school of social and home service, the summer session and the university extension division. The university is modern in every appointment. In 1922 the instructors numbered 200 and the students 2,914 in regular session, 3,233 in summer school, and 3,219 in the extension division.

HISTORY. As with California, gold had much to do with the settlement of Colorado. The territory that is now the state was visited as early as 1776 by Spanish exploration parties; and Pike, Long and Fremont made expeditions into the mountainous regions of the state and carried East much information regarding this territory. A part of the land was obtained by the Louisiana Purchase in 1803, and other parts were later obtained from Texas and from Mexico. In 1859 began the gold rush, and in 1861 the Territory of Colorado was organized. Indians gave the settlers considerable trouble for some years, and the mining towns were often populated by lawless men from the East. Efforts toward the organization of a state were made in 1864 and in 1868, and in 1876 the enabling act was finally passed by Congress, and Colorado is known as the centennial state. After a short period of depression caused by a partial failure of the gold supply, Colorado began making progress, and her place among the states was soon assured.

STATISTICS. The following are the most trustworthy statistics available:

Land area, square miles	103,356
Water area, square miles	290
Forest area, acres	8,700,000
Irrigated area, acres	3,348,385
Population (1920)	939,629
White	928,311
Negro	11,318
Chief cities:	
Denver	256,491
Pueblo	43,050
Colorado Springs	30,105
Boulder	11,006
Greeley	10,958
Trinidad	10,906
Number of counties	63
Members of state senate	35
Members of house of representatives	65
Salary of governor	$5,000
Representatives in Congress	6
Assessed valuation of property	$1,590,267,667
Bonded indebtedness	$4,187,300
Farm area, acres	24,462,000
Improved land, acres	7,744,757
Wheat, bushels	23,289,000
Corn, bushels	12,876,000
Oats, bushels	6,727,000
Potatoes, bushels	11,070,000
Wool clip, pounds	5,332,344
Sugar beets, tons	2,280,000

Domestic animals:	
Horses	334,095
Mules	30,000
Milk cows	143,990
Other cattle	1,220,000
Sheep	855,973
Swine	172,264
Manufacturing establishments	2,631
Capital invested	$243,827,000
Operatives	35,256
Raw material used	$174,870,275
Output of manufactures	$175,622,335
Sugar, value	$37,000,000
Gold, value	$6,790,000
Radium, value	$7,500,000
Silver, ounces	5,400,000
Tungsten, value	$1,835,000
Copper, tons	1,350
Coal, tons	8,152,000
Miles of railway	5,327
Teachers in public schools	8,192
Pupils enrolled	232,757

Colorado River, one of the largest rivers in the Rocky Mountain division of the United States, rises in Grand County. The Green, having its source in Wyoming, is the chief tributary from the west. It flows southwesterly through Utah, Arizona, left by the current of the river.

In 1922 the United States government planned a gigantic irrigation and conservation project to be carried out under the direction of the United States Reclamation Service. Dams are to be constructed at Boulder and Lee Ferry, Arizona. When completed these dams will impound sufficient water to irrigate extensive areas. They will also protect Imperial Valley, Parker Indian Reservation, Palo Verde Valley and other areas from inundations.

See GRAND CANYON; IRRIGATION.

Colorado Springs. Thousands of tourists visit the city of Colorado Springs every year for the superb mountain scenery amidst which it is located, going from there to the medicinal springs at Monitou nearby. The city is sixty-five miles south of Denver, and has an altitude of 5,982 feet. Colorado College is located there and the State Asylum for the Deaf, Dumb and Blind. It is a railroad center but has no manufactures. It is perhaps the most noted resort on the continent for those suffering from pulmonary complaints. One of the largest fraternal insurance companies has successfully maintained here for several years a camp for its members afflicted with tuberculosis.

The city was founded by Gen. William J. Palmer, who gave it a chain of beautiful parks, including the famous Monument and Manitou Parks, and other scenic wonders. In 1908 the Garden of the Gods was presented to the city by the heirs of Charles E. Perkins. All these places, together with Pike's Peak, Seven Falls, Cheyenne Cañon and the Cave of the Winds are easily reached. The commission form of government was adopted in 1909. Population, 1920, 30,105.

Colossus, in ancient art, a statue of great magnitude, whence our adjective colossal. The most celebrated colossus of antiquity, the existence of which has been doubted, however, was a bronze statue of the sun-god at the entrance of the harbor at Rhodes. The work occupied the sculptor twelve years. It was designed to serve as a lighthouse. It stood 70 cubits, or about 105 feet high. According to an unfounded tradition this statue straddled the harbor, so that ships passed in and out between its legs. It was overthrown by an earthquake 234 A. D. In 653 it was sold by the Arabs for $260,000 to a Jew for old metal. A colossal statue of Zeus in the Parthenon was 60 feet high. One of Athena was 39 feet. The largest statue in the United States is that of Liberty Enlightening the World, 151 feet high, on Bedloe Island, in the harbor of New York.

Colt, Samuel (1814-1862), an American inventor. He was educated in his father's cotton mill at Hartford, but went to sea at an early day and became interested in firearms. Starting with an idea of the sixteenth century, he perfected a pattern for the first really practical pistol having a revolving barrel with a number of bores. Colonel Colt patented his revolver in 1835 and commenced its manufacture at Hartford. He built up one of the largest firearm factories in the world. In the earlier patterns the entire barrel revolved. Later he devised a plan of a breech having a short revolving cylinder, usually of six chambers, with but a single barrel. At first the cylinder was turned by hand.

THE COLISEUM, ROME

Later it was connected by a revolving mechanism with the hammer, so that in cocking the pistol a new chamber came into line with the barrel. See FIRE ARMS.

Columbia, a large river on the Pacific coast of North America. Its rivals are the Yukon and the Colorado. It is credited with a total length of 1,400 miles, and a basin area of 300,000 square miles. Through its tributaries, including the Kootenai, the Clarke, and the Snake, it drains the greater part of Oregon, Washington, Idaho, and a part of British Columbia, Montana, and western Wyoming. On the south, it drains the borders of Utah and Nevada. Its head waters mingle with those of the Fraser, the Saskatchewan, the Missouri, and the Colorado. There are divides where the tourist can throw a dipper of water one way into the drainage basin of the Atlantic, or the other way into the drainage basin of the Pacific. The mouth of the river was entered by Captain Gray in 1792. The valley was explored by the Lewis and Clark expedition in 1805. The mouth of the river forms an estuary separating Oregon and Washington. It is about thirty-five miles long, and from two to seven miles in width. A sandbar at the ocean entrance has been scoured out through the construction of government jetties. The national government has spent also about $4.000,000 in constructing a canal and lock at the Cascades, about 200 miles from the ocean. A similar work is under way at the Dalles, 150 miles farther up. It is estimated that these improvements will open up over 2,000 miles of navigable waters to steamers from the Pacific. The Columbia has long been noted for its salmon fisheries. Half a million cans of the best salmon in the world are put up on its banks annually. See CASCADES; PORTLAND; SALMON; OREGON; WASHINGTON.

Columbia, a city of Lancaster County, Pa., on the Susquehanna River, the Philadelphia & Reading and the Pennsylvania railroads, and the Pennsylvania and Susquehanna canals, 10 miles west of Lancaster. It is connected by electric lines with adjacent suburbs and towns. It is the seat of Franklin and Marshall College, has a public library, St. Peter's convent school, several newspapers and banks, a public hospital and a state armory The city was founded as Wright's Ferry in 1726 by the Quakers. In 1798 it was one of the places considered for the capital of the United States. The original bridge crossing the Susquehanna was burned in 1863 to prevent the Confederates entering Philadelphia. The census of 1920 gave a population of 10,836.

Columbia, the capital of South Carolina, and county seat of Richland County, on the Congaree River near the junction of the Broad and Saluda rivers, on five railroads and the Columbia Canal. The city is built on a bluff, 15 feet above the river, and is made beautiful by numerous shade trees and flower gardens.

Columbia is situated in the heart of a fertile cotton-growing region. Forests of valuable timber are in the vicinity, and there are vast deposits of kaolin, a valuable clay used for pottery in the region. There are many flourishing industries here that make these raw materials ready for the market. Cotton-spinning is another important industry, also the making of cotton duck, the annual output of which is very large. There are sawmills here, sash and door factories, machine shops, cottonseed oil mills, fertilizer plants and hosiery mills. Water power for manufacturing, lighting and the operation of the street railways is furnished by the Columbia Canal, but most of the factories prefer electric power. To meet this demand a 25,000 horsepower hydro-electric plant was completed in 1916.

The city has adequate supplies of water, gas and electricity. The more important buildings include the State Capitol, which cost $4,000,000 to erect and which is modeled on the plan of the Capitol at Washington; the Executive Mansion, the penitentiary, the Insane Asylum, the Federal building, the city hall, and the buildings of the University of South Carolina. Besides the public schools there are Chicora College, Columbia College for Women, the Lutheran Theological Seminary, two colleges for colored youth, Benedict College, Allen University, and an Ursuline convent.

There are also a number of business colleges, and the Y. M. C. A. and Y. W. C. A. maintain schools.

Columbia was founded in 1786, and the State Legislature first met there in 1790. It was devastated by fire on Sherman's march to the sea in 1865, when a large part of the city, including the State House and Library were burned. The commission form of government was adopted in 1910. Population, 1920, 37,524.

Columbia River Highway, a scenic road which has made the traveller acquainted with the beauties of the Columbia River and its shores. Work on the road was begun in 1913, and it was opened to the public in 1916. It extends from Portland, Oregon, to Seaside, on the Pacific Ocean, and east from Portland to the Sandy River. Its total length is 60½ miles. It runs along the course of the river, passes through several tunnels, and over bridges and viaducts some of which are hundreds of feet long. It was planned with a view to preserving the natural beauties along its route. The dalles along the way are famed for their rare, wild beauty.

Columbia University, an institution of higher learning in New York City. It was founded by the colonial authorities, the Church of England taking the lead. The first money was raised by public lottery. The first president assumed office July 17, 1754, in the schoolhouse belonging to Trinity Church. He had eight students. A royal charter was granted on October 31 of the same year, the institution taking the name of King's College, providing that the balance of control should rest with the Episcopal Church. This clause was later stricken out. As a matter of fact, King's College was noted for catholicity of spirit from the very beginning. When the Revolutionary War broke out the students pulled down the statue of King George that stood on the campus and entered Washington's army. On May 1, 1784, college work was resumed, the legislature of New York having changed the name to Columbia College.

Columbia University, as the institution is now named, consists of faculties of law, of medicine, colleges of physicians and surgeons, of philosophy, of political science, of pure science and applied science. It has also Columbia College, the undergraduate college for men, and Barnard College for women, schools of mines, engineering and chemistry, a teachers' college, the latter a high-rank professional school for the training of teachers, a school of business, a school of dentistry, a school of journalism, and in affiliation with it a school of pharmacy. Courses in university extension have been organized for the benefit of those who cannot attend regularly. During the World War the entire equipment of the university was enlisted in the service of the government. Schools of photography, explosives, radio, submarine detection, and gas engines were established, as well as a Student Army Officers' School.

Columbia University is governed by a group of twenty-four trustees. The university library, containing somewhat more than three-fourths of a million volumes, is the gift of ex-president Low. There were 29,222 students in attendance in 1922.

Columbian Exposition. See WORLD'S COLUMBIAN EXPOSITION.

Columbine, a fragrant honey-bearing flower of the buttercup family. This delightful flower is often called a honeysuckle, a shrubby plant to which it is not related. The American columbine blooms in May and June. The flowers grow on a woodland perennial herb two feet high. The five petals are, all alike, prolonged backward into straight honey-bearing spurs. The flowers are of a handsome delicate scarlet outside and yellow inside. They are pendant or nodding at first, but straighten up when they go to seed. The Rocky Mountain columbine has incurved spurs. It is blue or purplish, or even white. The garden columbine of Europe is the flower to which Jean Ingelow says:

> O Columbine! open your folded wrapper,
> Where two twin turtle-doves dwell.

The Scotch call these flowers "auld ladies' mutchie," or caps.

Columbite, a mineral of a black or brownish-black color and high specific gravity, the native niobate (or columbate) of iron and manganese, usually containing tantalate of iron. Columbite occurs in

granitic and feldspathic veins in the form of crystals and cleavable masses. It has some economic value for the preparation of salts of niobium and tantalum. It is found in various parts of Italy, Bavaria, Finland and the Ural region. In the United States it occurs in states near the Appalachian mountain system, and in Colorado and California.

Columbine. See HARLEQUIN.

Columbus, Ga., county seat of Muscogee county, is situated on the east bank of the Chattahoochee River, and is served by several railroads. It is connected with Appalachicola by steamship lines. Columbus is the leading cotton manufacturing city of the South. There are many factories in the city, and numerous machine shops, ginning-mills, cotton-seed oil mills, etc. Dams across the Chattahoochee give an abundant water power. There are many fine buildings here, both public and private, and numerous schools. It was settled in 1827, and chartered as a city in 1836. Population, 1920, 31,125.

Columbus, the capital city of the state of Ohio. It is situated on the Scioto River, at the geographical center of the state. The site is a level river plain. The general plan of the city is that of a Maltese cross, extending east and west seven miles; north and south, eight miles. These arms are traversed by two main thoroughfares, High Street and Broad Street, intersecting each other at right angles in the center of the city. They are planted with avenues of shade trees. At their intersection is a magnificent park of ten acres, called Capitol Square. The capitol building itself is a two-story structure surrounded by a colonnade of Doric columns, extending from the pavement to the roof. It is built of native gray limestone, and cost in the neighborhood of $3,000,000. With additions, it covers nearly three acres. The site of Columbus was selected in 1810; the city was surveyed in 1812; and the capital was removed thither from Chilicothe in 1816. Among other public institutions, the state university, a state hospital for the insane, schools for deaf mutes, blind, and imbecile, as well as the state penitentiary, are located here.

The public library contains about 100,000 books, that of the Ohio State University over 140,000 volumes, and the Ohio State Library over 225,000 volumes, including about 100,000 volumes for a travelling library, and a public school library of 100,000 volumes. The law library of the Supreme Court is one of the most comprehensive in the United States.

In 1810, Chillicothe being the capital of the State, the Legislature passed an act making Columbus the future capital. Originally designed as a residence city, Columbus has developed into an important commercial and industrial center. Its nearness to coal, iron and natural gas fields has given it many advantages. There are over 800 manufacturing plants here which give employment to about 40,000 people. The city is located on 9 trunk lines and 11 electric lines.

Columbus has a modified Federal form of government, adopted in 1916. Public utilities are owned by the city. Population 1920, 237,031.

Columbus, Christopher (1446 (?)-1506), the discoverer of America. He was born at Genoa in 1446 and died at Valladolid, Spain, May 21, 1506. The Italians called him Cristoforo Colombo; the Spaniards, Christobal Colon. His father was a Genoese wool comber. Beyond the facts that he received a good education, was fond of mathematics, geography, and travel, and that he went to sea early in life, little is known of young Colombo. In 1470 he married a sea captain's daughter at Lisbon, then the most enterprising seaport in the world. Columbus appears to have inherited a lot of charts and instruments belonging to her father. He mastered books of travel, studied the various theories of the shape of the earth and investigated the traditions of new lands in the west.

The Turks had intrenched themselves about the eastern end of the Mediterranean, cutting off former lines of traffic by ship and caravan with India and the far east. The southern route by way of the Cape of Good Hope was unknown. The ships of the Mediterranean lay rotting at the wharves. Merchant princes had empty warehouses. People long accustomed to the

products of the east went without. The profitable commerce of centuries, thus interrupted, was seeking new lines of travel, not controlled by the Turks. The Portuguese emboldened by the mariner's compass, lately come into use, were seeking a passage around the southern end of Africa. Columbus was of the opinion that a route directly westward would lead to India. Filled with the great idea, he made application to his native city, Genoa, to John II of Portugal, and to Henry VII of England for money and ships to make a trial voyage. He passed eighteen years in a struggle with poverty, striving to overcome ridicule and opposition. Finally—call it credulity, faith, or statesmanship—a woman, Isabella, queen of Spain, one of the most gracious personages in history, listened to his plea and declared that so great a project should be carried out, even though she were obliged to pawn her jewels to find the means.

Friday, August 3, 1492, Columbus set sail from Palos, Spain, with three small ships, the Pinta, the Nina, and the Santa Maria. He went by way of the Canary Islands, where he took aboard a last supply of fresh water and sailed boldly forth into unknown waters. Terror seized his sailors, and nothing but his commanding presence and skillful management prevented their throwing him overboard and returning home. The picture of Columbus —anxious, fearless, determined—explaining his views to his officers, watching every floating bit of grass or weed, but sailing on and on over pathless waters and under strange skies, is an inspiring theme. Finally birds were seen, and the prows of the little ships were turned to follow. The smell of growing trees seemed to be wafted from the west. Columbus offered a reward to the first to see land. He himself was the first to sight a twinkling light over the waves. At two o'clock on the morning of October 12th, sixty-nine days after their setting out, a cannon shot from the Pinta announced the sight of land. It is no wonder that on landing Columbus threw himself on the ground, kissed the very earth, and returned thanks for the coming true of a lifetime of hope and prayer. Then, drawing his sword and raising aloft the banner of Spain, he took possession of a New World in the joint names of Ferdinand and Isabella, sovereigns of Castile and Leon.

The first land discovered was the island of San Salvador, one of the Bahama Islands. Columbus built a wooden fort, and left thirty-nine volunteers to hold it. He also visited Cuba and Hayti before returning.

When Columbus set sail from Palos the courtiers jeered at his wild scheme, the populace wept and bewailed the fate of friends who should never return, and many a curse was hurled at the head of so hare-brained and wild an adventurer. On his return the same people could not cheer loud enough; bells were rung; cannon thundered salvos of welcome. Columbus and his companions were conducted to their sovereign in procession. Indians, palm trees, fruits, all sorts of specimens from the new country were carried along in view of the excited people. A chair for Columbus was placed next the throne of the king, and he was invited to relate his adventures. There was no difficulty in getting a hearing from Ferdinand now. Columbus was made viceroy of the New World and made three additional voyages to explore and to locate forts. Believing he had found India, he called the region the West Indies, and the natives Indians.

It would require volumes to relate the troubles that befell after the first flush of success had passed by. Envy, greed, and calumny assailed him. Some wanted the gold there might be in a new country, others coveted the possession of the New World. To Ferdinand they represented that Columbus designed to create and rule an independent empire beyond the sea. To Isabella they drew a picture of cruelty to the Indians. As a result orders were given. Columbus was sent home in chains like a dangerous criminal. Once face to face with the queen, we may believe he had no difficulty in clearing his good name. None the less, he died broken-hearted at Valladolid, desiring that his chains be placed in his coffin. According to his wish, his remains were transported to the city of Santo

COLUMBUS

From the Painting by V. Brožík (Metropolitan Museum of Art)

Domingo, which his brother had founded. When, in 1795, the city with the island became a possession of France, the coffin of Columbus, as it was supposed, was removed with every sign of high honor to the Cathedral of Havana. In 1898, when Cuba was granted independence, the remains were taken to Spain. They now rest beneath the pavement of the grand old Cathedral of Seville. A marble slab bears the famous inscription, "To Castile and Leon, Columbus gave a new world." Historical accuracy requires the addition of a statement to the effect that in 1877 a lead casket was found in the old monastery at Santo Domingo that is thought to contain the true remains of the great discoverer. It is believed quite generally that the body removed was that of his son, and that Columbus still reposes at Santo Domingo, the resting place of his choice.

Documents recently brought to light in the archives of Genoa indicate the poverty of the famous expedition. The great admiral was paid a salary of $300 a year. The two captains who accompanied him received a salary of $200 each. The members of the crew were paid at the rate of $2.50 a month. The fleet was worth about $3,000. The entire expense of discovering America did not exceed $7,000,—less than the cost of a mere salute fired nowadays by a battleship in honor of the president.

Columbus was a man of pure life, a scholar, an enthusiast, a man of large views, integrity of purpose, sagacious, enterprising, persistent, and possessed of executive ability in no ordinary degree. He lived in an atmosphere of ignorance, prejudice, and selfishness, to say nothing of malice and the blackest treachery. His life is the record of a great man, thwarted and denied a free hand by authority, pestered by petty foes, and hunted to death by powerful ones. The best account of his life and services likely to be at hand is to be found in John Fiske's *Discovery of America*.

Column. See ARCHITECTURE.

Comanche, kō-măn′chē, a tribe of American Indians belonging to the Shoshone or Snake family. When first known to the whites they were living in eastern Colorado, where they had already obtained horses of Spanish stock from the southwest, and had become expert and daring riders. They were driven southward by the Sioux into the region lying between Santa Fé and Mexico. They were armed with the bow and arrow. Later the Comanches obtained firearms from the whites. They lived largely on the chase of the buffalo, from the skin of which the squaws constructed their wigwams. There were at one time at least 20,000 of the tribe, perhaps more, as the number of warriors was estimated at 5,000. The Spaniards had a knack of making peace with most Indian tribes; but they were at constant enmity with the Comanches, who bore down upon their settlements along the Mexican borders in many a raid, killing the adults and carrying away the children for adoption. About 1816 smallpox played havoc with the tribe. When the railroads reached their country the Comanches became a perfect scourge and gave the United States troops much trouble. A small remnant, perhaps 1,500 in all, is now located on a reservation in Oklahoma. See INDIANS; APACHE; MILES.

Comb, a well known instrument used in the care of the hair. A comb is a thin strip of any stiff, tough material, furnished with teeth. Several metal strips are set on a frame to make the curry comb used for animals. Toilet combs are straight. Curved combs of many shapes are used to hold a woman's hair in position. The combs of the ancients seem to have been made of wood, chiefly boxwood, and later of ivory. Modern combs are made in a variety of ways. Tortoise shell is heated until it is plastic, when the spaces between the teeth are punched out. Bone combs are first shaped. All the teeth are then cut at the same time by a number of circular saws running side by side on the same axis. Celluloid and metal combs are cast. Rubber combs are pressed into molds while soft and are afterward hardened by vulcanization. In stamping out combs material is saved by having the teeth interlock. According to the latest statistics 34 American comb factories employ 1,399 people, and pay them $572,467 a year. The annual

output is worth nearly $2,000,000. We also import many combs from abroad where they are made cheaply. See HAIR; BARBER.

Combing. See CARDING.

Combustion, ordinarily used as synonymous with burning, is the union of a substance with oxygen, accompanied by the evolution of heat and light. In a wide sense, it may signify any chemical action with like result. The combination may be a slow one, as when phosphorus is slowly consumed in the air, or more violently when a flame is applied to it. The result, as far as the total amount of heat is concerned, is the same, the difference in temperature causing the light in the one case and not in the other. The slow invisible union of a substance with oxygen is called oxidation. The rusting of iron is a familiar example. Combustion usually results in a gas and a solid residue. Experimentation has shown that though a body may seem to be destroyed the matter is merely changed in form, for the weight of the resulting gas is the same as that of the substance burned plus the oxygen used.

Comedy, that department of the drama which appeals to the sense of the humorous or ridiculous. Amusement and fun are prominent features of comedy, and the outcome must be happy, or at least leave a pleasant impression. Horror and grief are elements of tragedy, and the end must be in a measure disastrous. In a broad sense, comedy includes all forms of tragicomedy, farce, and melodrama. In a more restricted sense, comedy, while separated on the one hand from tragedy, is separated on the other from that which is farcical or grossly comical. Gloom, sadness, and soberness are out of keeping with real comedy; so also is the grotesque and all that is absurdly extravagant. A farce may be classed properly as low comedy. It is the province of comedy proper to satirize in a pleasing way the weaknesses of humanity, the follies of society, or the humorous incidents of life.

As "the history of the Greek stage is the history of dramatic art," we need not go elsewhere to look for the beginnings of comedy. In the Greek colony of Sicily, "to this day the home of spontaneous mimicry," it is said to have arisen. At the vintage festival held yearly in honor of Bacchus or Dionysus, the comus or procession was the principal feature; the word comus signifying a revel continued after supper. The participants went about in carts or on foot, wearing gay costumes and indulging in jovial mirth, interspersed with jests at the expense of the onlookers. A song sung in these processions was called a comus song, or comus ode, whence the word comedy. Susarion, who is called the founder of comedy, and who lived in the sixth century B. C., is said to have traveled from place to place with a small movable stage, holding up to ridicule the follies of the time.

Comedy assumed definite form during the age of Pericles. There are three distinct periods of Greek comedy. The first, called Old Comedy, dates from the establishment of the democracy by Pericles. There was a strong political tendency in Old Comedy, the chief butts of satire being the influential men and rulers of the time. Aristophanes belongs to this period. His best comedies are *The Knights, The Frogs, The Clouds,* and *The Wasps.* It has been said that "were it not for the limitations of the female characters which Greek manners necessitated, Aristophanes would perhaps have been the equal of Shakespeare in comedy." In these old comedies, masks imitating the faces of individuals were worn frequently. Middle Comedy marks the time when heads were busy and tongues were wagging over the opposing schools of philosophy and rhetoric, instead of rival political leaders. Law forbade the name of a living person to be brought on the stage, or the face to be imitated by a mask; so classes, instead of individuals, became the objects of jest. A change also occurred in form. The parabasis or speech in which the chorus addressed the audience, always a feature of Old Comedy, was omitted in Middle Comedy. New Comedy was Middle Comedy matured, and corresponds to the comedy of modern times. Manners and social conditions were now held up to ridicule. Menander is the one notable name in Grecian New Comedy.

Among Roman writers of comedy, Terence and Plautus stand first. Their work was based on the Grecian models and contains little that is original.

From ancient times until the later Middle Ages, there is nothing worthy of note in the history of dramatic literature. When the drama revived it was in the form of miracle plays. These miracle plays were presented in nearly all European countries, and led up to modern comedy; which would seem to have appeared as a result of the natural desire for amusement and variety. The miracle plays were concerned chiefly with religious subjects; but now and then some hint of comedy appeared. In *Noah's Flood* played at Chester, a domestic quarrel occurs before Noah's wife can be persuaded to enter the ark. When she has been pushed and pulled aboard by her children she is so enraged that she belabors her husband until he cries for mercy. Even in the *Play of the Shepherds* some inventive genius introduced a comical sheepstealing scene before the song of angels informs the shepherds of the birth of Christ. Gradually current topics were brought into the dialogues, and characters from real life appeared on the stage. The interlude, introduced by John Haywood to relieve the strain of more serious presentations, contained many of the elements of comedy.

In 1540 appeared the "first play which bears the distinctive marks of real comedy." This is Nicholas Udall's *Ralph Royster Doyster.* It may be said to mark the beginning of modern English drama. Shakespeare is a master of comedy as he is of tragedy. *Much Ado about Nothing* and *As You Like It* are two favorites among his thirteen comedies. Other names worthy of mention as writers of English comedy are Ben Jonson, Beaumont and Fletcher, Congreve, Goldsmith, and Sheridan.

In other countries the origin of comedy has been similar to that in England, although different influences have given it different characteristics. France produced comedies much earlier than England, although the French names most noted in comedy, those of Corneille and Moliere, do not appear until after Shakespeare's time.

In more recent times, comedy has crowded tragedy from the stage. Great tragedies, such as Shakespeare's, presented by great actors, still keep their place, but the popular play is the comedy.

Comedy amuses, corrects, and heartens. It shows that the vanities of life are not final, and the failures not always fatal.—Gayley.

Comedy presents us with the imperfections of human nature; farce entertains us with what is monstrous and chimerical; the one causes laughter in those who can judge of men and manners, by the lively representation of their folly and corruption; the other produces the same effect in those who can judge of neither; and that only by its extravagances.—Dryden.

Comedy of Errors, The, a comedy by William Shakespeare. It was one of Shakespeare's earliest plays, having been produced December 28, 1594, at Grey's Inn Hall. It was first published in 1623. The plot is based on the resemblance between twin brothers, both named Antipholus, and the resemblance between their two servants, also twin brothers, both named Dromio. These likenesses give rise to a series of laughable mistakes. *The Comedy of Errors* is the shortest of all Shakespeare's plays, containing only 1,770 lines. Robson and Crane, American actors, have presented the play with great success, appearing in the roles of the two Dromios.

QUOTATIONS.

Words are but wind.
Every why hath a wherefore.
Headstrong liberty is lashed with woe.
Small cheer and great welcome makes a merry feast.
He that commends me to my own content
Commends me to the thing I cannot get.

Comenius, ko-mē′ni-us, **Johann Amos** (1592-1671), a Moravian educator. Comenius was born in a Moravian village and died at Amsterdam. He became a teacher in his native country, but was driven out by war and religious persecution. He went to Poland and was made bishop of the Moravian Brethren. At one time he contemplated coming to the New World to accept a position in Harvard University. He is remembered chiefly for his *Orbis Pictus,* or the pictorial world, a primary reading book. It is the first in which pictures were employed to assist children in learning to read. Of course the cuts

now seem very rude, but to children of the Old World villages at that time, these were wonderful books. The *Orbis Pictus,* published in 1657, marks a distinct step in education. To be accurate, it was an abbreviation of a larger and more pretentious work, published in 1631. For some idea of the general style of the contents of the *Orbis Pictus,* see article on NEW ENGLAND PRIMER.

Comets, celestial bodies that come from space, pass around the sun and disappear in space again. They are accompanied by trails of light, hence the name which is derived from a Greek word meaning hair. Over eight hundred comets have been studied and listed. Some return with regularity. Others are not expected again. Encke's comet was rediscovered September 12, 1904, at a distance of 107,000,000 miles from the earth. It swept around the sun at the rate of 1,250,000 miles a day, and disappeared in space. Some comets are visible for a week or two, others for months. One has been seen for two years. Some are bright enough to be seen in the daytime; others are visible only at night and by means of a telescope.

Tycho Brahe discovered that comets are celestial bodies outside of our atmosphere. Newton demonstrated that the force which keeps the planets in their orbits controls also the comets. Halley first proved that comets return at regular intervals, or have, as astronomers say, periodicity. Of these, Halley's comet has a period of about 75 years; Encke's, 1,204 days; that of Biela, 6¾ years; that of Faye, 7½ years.

Planets move from west to east; but comets move from east to west. The orbits or paths of planets are elliptical; those of comets take various forms of ellipses or parabolas, usually the latter.

A comet consists of a head, containing usually a more or less condensed portion called a nucleus, and a luminous wisp which always points away from the sun. When approaching the sun, the train streams out behind like hair. When the comet is receding the same imposing light streams out in advance, suggesting a swarm of luminous star dust, repelled by electricity in a direction opposite to that of the sun. The tail is seldom less than 5,000,000 miles long, and in some comets attains a length of 100,000,000 miles.

Comets have been regarded as dread portents of war and pestilence and famine. Milton speaks of a live comet that

> From his horrid hair
> Shakes pestilence and war.

Shakespeare says:

> When beggars die, there are no comets seen;
> The heavens themselves blaze forth the death of Princes.

Astronomers also have felt what now seems needless alarm lest one of these brilliant travelers should collide with the earth. It now appears that no more harm is to be apprehended from the tail of a comet than from the northern lights, while the chance of running into a nucleus is remote, and is unlikely to be attended with serious result. Very possibly a shower of shooting stars would be the only noticeable phenomenon. The density of a comet does not exceed that of the residuum of air left in a first class air pump.

Professor Young answers the question of how it is possible for so light a body to make headway in space, by saying that space is a perfect vacuum offering no resistance to the passage of bodies. He adds the striking statement that if the earth were annihilated save a single feather, that feather would continue to move in the earth's present orbit at a rate of eighteen and one half miles a second.

See METEORITES; STAR; HALLEY.

Commemoration Ode, a poem by James Russell Lowell written in 1865. The full title is *Ode Recited at the Harvard Commemoration.* The poem was written for, and read at, the memorial exercises at Cambridge, in commemoration of those members of Harvard College who had given their lives to their country. This is the finest and most famous ode in American literature. Dr. Burton says: "It should be read by all good Americans at least once a year." We quote:

> How could poet ever tower,
> If his passions, hopes, and fears,—
> If his triumphs and his tears,
> Kept not measure with his people?
> Boom, cannon, boom to all the winds and waves!
> Clash out, glad bells, from every rocking steeple!
> Banners, advance with triumph, bend your staves!

And from every mountain-peak
Let beacon-fire to answering beacon speak,
Katahdin tell Monadnock, Whiteface he,
And so leap on in light from sea to sea,
Till the glad news be sent
Across a kindling continent,
Making earth feel more firm and air breathe braver:
"Be proud! for she is saved, and all have helped to save her."

Commencement, the name given in America to the concluding exercises of the college year, and also used loosely for the graduating exercises of high schools, academies, etc. It is derived from the French verb *commencer,* to commence. The term was first used in the old English universities, where, upon receiving his degree, each graduate was supposed to commence to teach. The better term was "inception" and the beginners were often called "inceptors" as well as "commencers," but Cambridge used and still uses commencement. From her it was received by Harvard, the oldest American university, and was adopted later by other American colleges. In colonial times the exercises were held in the fall, and often the name has been thought, though mistakenly, to apply to the commencement of the college year. See COLLEGE; UNIVERSITY.

Commerce, a term applicable to trade, traffic or interchange of goods, merchandise or property of any kind, but used more especially of trade on a large scale, carried on by transportation of merchandise between different countries, or between different parts of the same country, and distinguished as foreign commerce and domestic or internal commerce. Thus we may speak of the commerce between the United States and France, or between New York and New Orleans. A specific use of the word occurs in the United States, where "interstate commerce" is the term officially applied to commercial transactions and intercourse between persons resident in different states of the Union, or carried on by lines of transport extending into more than one state. The Constitution grants to Congress the general power of regulating such commerce.

The advantages of commerce to a nation were recognized by the fathers of the American Republic. Thus Alexander Hamilton said, in the Federalist, "A prosperous commerce is now perceived and acknowledged, by all enlightened statesmen, to be the most useful as well as the most productive source of national wealth; and has accordingly become a primary object of their political cares." And Thomas Jefferson said in his Correspondence, "I think all the world would gain by setting commerce at perfect liberty."

The beginnings of commerce are found in the economic period of the world's business history which succeeded the stage of isolated economy. In that earlier stage the household produced everything it needed; all its wants were statisfied by the labor of its members; but with the lapse of time there was an inevitable growth of intercourse between the self-contained units, and mankind developed into the stage of commercial economy. This stage of economic life is best seen in the history of the Middle Ages. Its characteristic feature was that the producer did not consume all that he produced, and the factor of exchange of commodities appeared. Wants became more numerous; consumers demanded a greater variety of commodities; and this demand was met by means of trade or commerce. The economic change was thus described: "The significance of trade does not arise from the fact that there is trade between the units, for as a matter of fact such trade is found in the later stages of the isolated or household economy; but we now have trade within the unit. The members of the household no longer, as before, produce what they need, but primarily produce what others need. We now have separate classes of producers and separate classes of consumers. Men for the most part no longer consume their own products, but the products of others which they secure through trade. In other words, instead of the self-sufficing economy, we have the trade or commercial economy."

In the Middle Ages, therefore, commerce was greatly stimulated and trade centers were established. Industry attained importance and became distinct from agriculture. Workmen became an independent class. A community of in-

terest was established by the trading of one class with another, and the foundations of the modern industrial world were laid. Fortunes were made in trade and commerce, and the ancient monopoly of wealth enjoyed by the landowner were broken up. The way was paved for the coming of the stage of industrial economy, in which accumulated wealth is employed as industrial capital, to increase and cheapen production. In modern commerce, capital and enterprise go hand in hand, and every part of the civilized world is closely searched for opportunities and markets.

While these economic changes had been taking place there was more or less international commerce, of a desultory kind. The first merchants of whom we read as engaged in foreign trade were the Arabs, trading by land and carrying their goods and purses of silver from one region to another. The Phoenicians traded by sea, and established a trade route between Egypt and Syria, dealing in the corn and wine of the Nile, and the oil, spices, silk and dyestuffs of western Asia. A hardy race of seamen, they first became carriers of salable merchandise, then merchants, and finally manufacturers. The countries bordering the Mediterranean were their principal field of operation, but they went to Cornwall, in England, for tin, established colonies, and finally founded Carthage, which became noted for its extensive commerce. Before Carthage was destroyed by the Romans her mariners and merchants had passed into the Atlantic and founded commercial ports and depots in western Europe.

About the middle of the fifth century the city of Venice was founded, and for a thousand years that city occupied a foremost position in world trade, rivaled for many years by Genoa.

Kaffa, in the Crimea, founded by the Genoese, became a great seat of commerce between Europe and Asia; and international trade grew and prospered, with frequent handicaps of war, until it received its great stimulus in the Middle Ages. Then the towns of the Hanseatic League, on the shores of the North Sea and the Baltic, became prominent in commerce, the chief objects of which were still the skilled products of the East. The ports of France and Spain became busy as distributing centers, and at the close of the Middle Ages there was a great market for commerce at Antwerp. In the fifteenth century, the centers of trade were transferred in turn to Lisbon, Amsterdam and London. North America had been discovered, ocean voyages were no longer feared by mariners, and commerce was being extended in every direction.

Foreigh merchants in England were at first regarded with suspicion, but England was for centuries long behind other lands industrially and commercially. The organization of the Teutonic Hanse was met by the establishment of the Hanse of London, both being organized for the protection of commerce. They did not tend to create a national trade, but were rather alliances of the merchant oligarchies of the cities included in them, for their mutual advantage. When Flemish, French or German traders arrived at an English port they therefore found themselves face to face with a governing trade body of the same character as that to which they themselves belonged at home. They were not exactly unwelcome, for they bought and carried away the raw produce of the country, wool, cloth and leather, and they brought fine cloth from Flanders, wine from Gascony, and other products in exchange. But it was feared that they would succeed in breaking down the monopoly of the English merchants in the internal trade. Hence they were subjected to a stringent code of regulations, which provided among other things that they were not to remain in the country more than forty days. Such was the condition of commerce at the date of Magna Charta. Two articles of the charter provided that merchants should have safe passage to and from England, and should be free from exorbitant customs. This by no means secured freedom of trade, but after the reign of Henry III the barriers against foreign trade were gradually thrown down, and England finally became a free-trade nation, with a foreign commerce that extended to the ends of the earth.

In the economic development of the early American communities all the primitive stages were passed through, but American trade and commerce were established on a firm footing in the nineteenth century, when, too, after the first passage of the Atlantic by a steam vessel and the building of railways, the commerce of the world advanced by leaps and bounds.

Modern Improvements. The modern movement of trade and commerce in America is strongly in the direction of a national economy. Business knows no local boundaries. Foreign markets are being rapidly opened up to American industries. Agriculture is still most important, and agricultural products still bulk largely in our exports, but our industrial exports now greatly exceed them in total value, and the national business is manufacture. Under a so-called "protective policy" the development of American manufactures has been the wonder of the world.

The foreign trade of the United States, including both imports and exports, has grown from $4,258,504,805 in the fiscal year 1914, the year the World War began, to $10,170,060,379 in 1921, and in the busy year of 1920 it reached the enormous total of $13,342,340,777. In 1922, when the world's business was unusually poor, the total imports and exports of the United States amounted to $6,888,049,000. For many years the balance of foreign trade has been in favor of the United States; and for the fiscal years 1914-1921 the annual average excess of exports over imports was $2,563,792,677.

The rank and value of United States exports and imports for the fiscal year 1922 by industries, as reported by the United States Chamber of Commerce, were as follows:

Exports

Rank and Group	Value
1. Food and food products	$1,361,870,000
2. Metals and products	996,398,000
3. Textiles and products	698,282,000
4. Chemicals and products	559,799,000
5. Tobacco and its mfrs.	226,100,000
6. Coal and coke	170,982,000
7. Lumber and its mfrs.	92,621,000
8. Leather and products	80,177,000
9. Paper and printing	50,234,000
10. Stone, clay, and glass products	31,866,000
11. Rubber manufactures	30,786,000
12. Miscellaneous	79,909,000
Total	$4,379,024,000

Imports

1. Food and food products	$ 672,810,000
2. Textiles and products	656,608,000
3. Chemicals and products	248,475,000
4. Metals and products	154,949,000
5. Leather and products	133,665,000
6. Lumber and its mfrs.	120,207,000
7. Paper and printing	92,462,000
8. Rubber and its mfrs.	76,831,000
9. Stone, clay, and glass products	68,919,000
10. Tobacco and its mfrs.	60,253,000
11. Miscellaneous	223,846,000
Total	$2,509,025,000

United States ships with cargoes entering British ports totaled 486,897 tons in 1918; 1,625,498 tons in 1919; 2,366,123 tons in 1920, and 2,750,739 tons in 1921, out of a total tonnage of British and foreign vessels in foreign trade entering and clearing with cargoes from British home ports in the latter year. A ship subsidy bill, designed by the government for the encouragement of commerce in American-owned vessels, failed of passage in the closing days of the 67th Congress, in March, 1923.

Canada. Canada's imports in 1922 amounted to $747,804,332, and the exports from the Dominion totaled $753,927,009. In 1921, a more favorable year for trade, Canada imported $1,240,158,882 worth of goods and exported $1,210,428,119 worth. These figures do not include gold or silver imports or exports. Merchandise imports from the United States in 1921 were $856,176,890; in 1922, $516,105,107. Merchandise exports to the United States were, in 1921, $561,701,936; in 1922, $305,422,177.

Great Britain. Great Britain's trade and commerce in 1921 totaled $1,896,935,567, of which $1,086,687,213 represented imports, and $810,248,354 exports. The exports included produce and manufactures of the United Kingdom to the value of $703,196,282, and foreign and colonial merchandise valued at $107,052,072.

Commerce, Department of, an executive department of the United States

government first organized in 1903 as the Department of Commerce and Labor. In 1913 the departments were separated. (See LABOR, U. S. DEPARTMENT OF.) The Secretary of Commerce is at the head of the department and is a member of the President's Cabinet. (See CABINET.) The department includes a number of important bureaus, such as the Lighthouse Bureau, the Bureau of Foreign Commerce, the Bureau of Manufacturers, the Bureau of Census and the Coast and Geodetic Survey.

Commercial Arbitration. A commercial court was established in England years ago by the judges of the King's Bench Division. This court disposes of cases that ordinarily arise from business transactions—such as disputes over exports and imports, excess freight charges, etc. The court adheres to the rules for evidence prescribed for other courts of the realm, but its procedure is simplified and many technicalities are waived. Decisions are quickly reached and the expense of litigation is greatly reduced. The first court of commercial arbitration in the United States was established at Chicago on May 4, 1921. See ARBITRATION, subtitle, ARBITRATION, COMMERCIAL.

Commission Government. See MUNICIPAL GOVERNMENT.

Committees of Correspondence, committees of patriots organized in the American colonial period before the War of the Revolution. They were practically propaganda and publicity committees, charged with collecting and circulating grievances of the Americans and of maintaining correspondence between the different colonies. Another object was to secure information in regard to Parliamentary acts in England. The first of these committees was formed in Boston, Mass., in 1772, and the results were so satisfactory that other similar committees were appointed in most of the other states.

Commodore, formerly a naval officer of the United States holding a rank above captain and below rear-admiral. The rank was abolished in 1899.

Common Carrier, the legal designation of any person or company whose business is the transportation of passengers or goods. Thus railroad companies, pipe line companies, steamship companies, street railway companies, etc., are common carriers. Because of the fact that the lives and property of those in whose country, state or city common carriers operate are entrusted to them, the common law places the carriers under obligation to serve equally everyone who can pay, and makes them liable for loss of or injury to the passengers or goods carried. In the latter connection, common carriers are liable for loss or injury caused by any other agent than an "act of God or of the public enemy." An "act of God is defined as that which occurs through no fault of a human being—as a tornado or a tidal wave, for example. Passenger carriers are extended the right of refusing to carry intoxicated persons, those suffering from contagious diseases, fugitives from justice, or those who would board a ship or train for the purpose of committing crime.

Common Law. See LAW.

Common Schools. See SCHOOLS.

Commons, in Great Britain, all who are not members of the House of Lords, that is to say, the general people. In a more restricted sense, the term applies to the lower house of Parliament, the members of which are elected by and represent the commons. The House of Commons now consists of 670 members. See PARLIAMENT; OXFORD.

Commonwealth and Protectorate, The, a name applied to the period of English history between the death of Charles I, 1649, and the restoration of Charles II, 1660. Following the execution of Charles I, the Rump Parliament decreed the establishment of the Commonwealth "without king or House of Lords." A council of state was appointed to have charge of administrative affairs, while legislative affairs were still attended to by the Rump. There were many difficulties to be met in England,—insurrections by royalists and by extreme democrats; rebellions in Ireland and Scotland; foreign war from France and Holland. Under such conditions the Rump Parliament, wholly par-

tisan and unrepresentative of the country, was unfit to deal with the situation. Cromwell, at last in 1653, weary of their bickerings and delay, went to the Parliament accompanied by soldiers, drove out the members and locked the door. After several attempts on the part of Cromwell to secure a working Parliament, the officers of the army drew up the Instrument of Government in which the chief power was vested in Cromwell as Protector of England. Although the document provided for an advisory council and a Parliament, the real power for the remainder of his life was exercised by Cromwell with all the authority of an absolute ruler. Nevertheless, it forms an important period in English history, for, unlike the "divine right" Stuarts, Cromwell exercised his authority for national, not personal, ends. Insurrections were crushed; the rebellions in Scotland and Ireland were put down, the latter, many think, with inexcusable ferocity; foreign war was successfully carried on, and the naval supremacy of Holland was destroyed; the first Navigation Act was passed, by which English commerce was promoted. Though the despotism of Cromwell had antagonized the people and prepared them to welcome the return of the Stuarts, the fact cannot be ignored that without the stern rule of Cromwell, a peaceable restoration of Charles II would have been impossible. See CROMWELL; NAVIGATION ACTS; CHARLES I.

Commune, in France the smallest division of a province or department. It corresponds to our township, and to the English parish. Each commune is in a measure independent, and is governed by its own council and a *maire,* or mayor. The communes vary greatly in population from a few dozen in a thinly populated, mountainous district up to the commune of Paris with its millions.

Communism, the common ownership of all property. Each member works for the community. Each is a member of one large family, embracing the entire community. Communism differs from socialism in that the latter contemplates that certain utilities or industries shall be owned by the people instead of the capitalists, and that wage earners work for the public instead of for private employers. Public ownership of waterworks, roads, gas plants, telegraphs, railroads, are some of the preliminary steps of socialism. Communism, however, extends to all forms of property. In a strictly socialistic community, a man may raise peas for his own table, but not peas for sale. The public pea patch takes care of the market. In a strictly communistic society, there are no private pea patches. The public patch is the only one; and, in fact, the public table is the only table. The communistic gardener could make no use of private peas if he had them.

The earliest Christian churches were communistic. Ananias and Sapphira, his wife, it may be remembered, were struck dead for pretending that they had put all their property into the common treasury, when in fact they were withholding a part. The various religious orders of monks and nuns are founded on the principle of communism.

The French Fourier (1772-1837), a Lyons merchant, questioned the righteousness of existing mercantile and manufacturing systems whereby the few become rich at the expense necessarily of the many. His doctrines, known as Fourierism, took root in the United States in the early part of the nineteenth century. Horace Greeley was very much impressed with the idea of communism as a preventive of misery and want.

Robert Owen, a British manufacturer, brought over a number of his countrymen to found societies. The most noted was that at New Harmony, Indiana. The Shakers are a communistic denomination, found chiefly in New York. The Oneida Community of New York was established in 1848. It carries on a number of industries.

All past efforts toward the partial or complete establishment of a communistic society, however, pale before the change seen in Russia since the revolution of November, 1917. Previously, communism was confined almost completely to the realm of theory, but the Russians, taking the

Communist Manifesto of Marx and Engels as their principal guide, have made a notable attempt to establish a true communist state. One of the outstanding features of the attempt is the fact that communism as conceived by the extremely radical elements in all lands cannot come to its full stature without passing through a period of rigid suppression of one class by another—the employing class by the working class. Born as it was in the heat of a world crisis, the Russian revolution was greatly hampered and modified by its lack of diplomatic and industrial intercourse with the other nations of the world. Latest reports (1923) indicate that Russia is really farther away from pure communism now than in 1920; but they indicate also that the ideal is still alive in the minds of the Russian leaders.

See BROOK FARM; SOCIALISM; NEW HARMONY; RUSSIA; BOLSHEVIKI.

Community Center, an organization of the adult members of a community, such as a school district, a township, or a village, for the general improvement of the members and the conditions under which they live. The school district is the most desirable unit to organize into a community center, the school house is the logical place for the meetings and the community forum is the best form of organization.

The National Congress of Community Centers held in New York in 1916, formulated the following principles as essential to the successful formation of the community center:

1. Public buildings should be available for the use of the people as a right instead of a permission.
2. Tax money should be used in the promotion, development and maintenance of community centers.
3. Community centers should be administered through responsible public officials.

THE COMMUNITY FORUM is the most desirable form of organization for a community center. Bearing in mind the foregoing principles, the form of organization should be as simple as possible, therefore the constitution and by-laws should be brief. The membership should include all adult residents of the district, and the school principal or some one nominated by him should be the executive secretary of the organization.

The Hollis-Johnson Community Forum measure, presented to Congress by the Grover-Cleveland Forum of Washington, contains suggestions for those desiring to form a community forum. Write the Bureau of Education, Washington, D. C., for this and other helps. If the Community Center is to be supported by public funds it will be seen that it must rest upon legal enactment, and the first great work of the center may be the securing of such legislation as is necessary to raise it from a volunteer and temporary organization to one having a responsible status. The forum and its work, have been described by ex-President Wilson in the following words:

> It is citizens going to school to one another in the common schoolhouses to understand and answer public questions as hitherto only representatives of the citizens have gone to school to one another in buildings provided for them.

The community forum should be what its name indicates, an *open forum* where any citizen of the district should feel free to present for discussion, under ordinary parliamentary rules, any subject proper to present to a public assembly.

But the center must be more than a debating society. Once it is opened, the community house should be completed into the *community home*—young peoples' organizations should be encouraged and provided for; entertainments, social gatherings, celebrations of national holidays, fellowship and other meetings should find a place on the program.

The community center is the most potent agent for enriching rural life and making the country so attractive to boys and girls that they will remain on the farm instead of going to the city. Young peoples' organizations closely affiliated with the community center are the Boy Scouts of America, Boys and Girls Clubs, and Camp Fire Girls.

THE COMMUNITY CENTER IN VILLAGES AND CITIES. In villages and small towns the community center might be styled the "melting pot" for local organizations, such as the commercial club, the village im-

provement society and organizations for the welfare of the community. Such organizations work more effectively and harmoniously if they feel that they have a common interest and that the work of each helps that of all the others. The community center is the organization through which this can be accomplished. Many school buildings in large cities are used as community centers under the immediate direction of the principal and teachers of the schools, with excellent results. A school principal or superintendent interested in the movement can usually effect an organization.

The local papers and the churches of a village or town can and should be made the most influential agencies in forming and maintaining community centers in their respective localities.

Commutator. See DYNAMO.

Como, a lake, a province, and a city in Lombardy at the Italian foot of the Alps. The province is the traditional headquarters of the Italian peddler of small wares. Lake Como is one of the most beautiful in Italy. It is sixteen miles in length and about two and one-half in width. It lies 700 feet above the level of the sea, nearly 200 feet above Milan. It is surrounded by mountains from 3,000 to 7,000 feet high, and is bordered by delightful driveways and country seats. Lake Como trout are celebrated for their flavor. The population of the entire commune, including the city, is about 25,000.

Compass, an instrument designed to indicate directions. It is constructed on the principle that a lodestone, or magnetized needle, will swing into a north and south line if mounted on a pivot, so as to turn freely. A suspended needle and a dial are the essential features. A mariner's compass is swung in rings in such a way that the dial keeps a horizontal position, however the ship may pitch and toss. These rings are called *gimbals*. The gimbals with the compass are then placed inside a box, called the *binnacle*. Inside the binnacle, in the direction of the ship's bow, is a vertical black line called the *lubber-line,* and the steersman must keep the point of the card which marks the prescribed course always in contact with the black line. The dial is laid off in the figure of a star with thirty-two rays corresponding to the thirty-two directions recognized by a seaman. Between north and northeast, for instance, designated in the usual way by N. and NE., are three additional directions called north-by-east, north-northeast, and northeast-by-north, designated as NbE, NNE, and NEbN respectively. To box the compass is to pass around the dial, beginning at the north, and naming the thirty-two directions consecutively.

It is difficult to give proper credit for the invention or discovery of the compass. The Chinese seem to have understood its secret 3,000 years before Europeans learned to steer without the aid of the sun and the North Star. According to some authorities, Marco Polo brought back a knowledge of the compass from Cathay in 1260.

Owing to the position of the magnetic poles and the unequal distribution of iron and magnetic ores, there are few lines on the earth's surface where the needle assumes an exact north and south direction. A deviation is called variation of the compass. The compass used for land surveying differs somewhat from the mariner's compass. Engineers who are running railroad lines or surveying public lands ascertain the variation by reference to the North Star and make due allowance. In the United States, the line of no variation crosses Lake Erie into western Pennsylvania and passes southeasterly into the Atlantic, near the boundary between the Carolinas.

Dr. William Gilbert, physician to Queen Elizabeth, first explained the action of the compass. In place of the theory that the needle is drawn into position by the influence of certain stars, he showed that the earth is a magnet, and that the earth acts on the needle as one magnet acts on another. Subsequent investigation has demonstrated the truth of Gilbert's theory. Inasmuch as unlike poles of magnets attract each other, that spot in the northern hemisphere that attracts the north pole, or north end of the magnetic needle, is considered the south magnetic pole of the earth. Moreover the magnetic poles are not located at the

geographic poles. In 1831 the south magnetic pole was located in Canada in latitude 70° 30′, longitude 95°. The north magnetic pole, *i. e.,* the pole that attracts the south end of the needle, is in latitude 72° 35′ S., longitude 152° E. Explorers in polar regions find it necessary to be on guard. When carried to a point east of the south, that is to say, the Canadian magnetic pole, the needle points west, and at a corresponding point to the westward, the needle points east.

See NORTH STAR; ROGER BACON; MAGNET.

Compass Plant, a large prairie plant called also "rosinweed," from the abundance of resinous matter it contains. It derives the name "compass plant" from the fact that when found on the prairies the stem leaves stand edgewise and point due north and south. This peculiarity, found also in the prickly lettuce, is due to the sensitiveness of the leaves to light. Both sides are equally susceptible, and only by standing vertically with their tips to the north and the south can the leaves secure uniform illumination.

Compleat Angler, The. See WALTON.

Composite Family, or Compositae, the largest family of flowering plants. Its outstanding characteristic consists in the arrangement of the flowers into a compact head on a common stem surrounded by an involucre of bracts, usually tongue-shaped or tubular. The ox-eye daisy, the dandelion and the sunflower are excellent representatives of the family.

Composition, English, the art of writing English, as taught in primary and secondary schools. In primary schools practice in writing is given as incidental to other subjects. Even the members of the First Reader class put together the words they learn to form sentences. This is composition, and in our public schools such practice is continued in connection with reading, grammar and other subjects, and is sometimes taught by means of a special class up to the high school. In high schools and academies English Composition or Composition and Rhetoric is a first year subject, continued during the course in connection with the study of literature, or by means of a literary society or regular rhetorical exercises in which all students participate. In colleges practice in writing is given under the subject of Rhetoric.

Composition as a high school subject follows and in a sense completes technical grammar with the essentials of which students should at this time be familiar. It precedes and introduces rhetoric, such subjects as choice of words, qualities of style, figures of speech, being treated incidentally either with or without a text-book on the subject. Text-books on composition deal usually with the four important classes of written discourse, narration, description, exposition, and argument. The chief object of the study, however, and the constant aim of the teacher, should be to give students daily practice in the art of writing until they express their thoughts readily on paper. Arlo Bates, in his practical and witty *Talks on Writing English,* says, "the way to write is to write" and goes on to liken writing to piano playing, skill in which can be acquired only by constant and patient practice. Those whom we regard as the greatest geniuses have often been the most patient and persistent in practicing their art.

"All through my boyhood and youth, I was known and pointed out for a pattern of an idler; and yet I was always busy on my own private end, which was to learn to write. I kept always two books in my pocket, one to read, one to write in. As I walked, my mind was busy fitting what I saw with appropriate words; when I sat by the roadside, I would either read, or a pencil and a penny version book would be in my hand to note down the features of the scene or commemorate some halting stanzas. Thus I lived with words. And I wrote thus for no ulterior use It was written consciously for practice."—Robert Louis Stevenson.

Compressed Air, as a motive power has come to have a widely extended use. The compression is effected by means of pumps from whence the air is transmitted through pipes to where it is to be utilized. It is mainly employed where the conditions or distance would not permit the use of belts or shafting, as in bridge-building and tunneling in mines. Its application to rock drills, in riveting-machines, or in air-

brakes on trains is familiar. In recent years, electricity has largely taken its place for certain purposes, but new uses are constantly being found for it.

Compromise of 1850, also called the Omnibus Bill. See CLAY, HENRY; FUGITIVE SLAVE LAW.

Compulsory Education, attendance at school enforced by law. That it is the privilege and duty of a state to train children for future citizenship has been recognized from ancient times. Sparta took boys from their parents at the age of seven, taught them to read and to be brave soldiers. Athens trained both brain and body, developed the moral nature and the sense of beauty. Rome gave military training at public expense.

In modern times there are laws in force in the United States and in nearly all European countries compelling parents to send children between the ages of six and fourteen or sixteen, to school during a certain number of months of each year.

State laws for the purpose of compelling school attendance were not in force generally until the latter part of the nineteenth century. They have been enacted usually as a result of the growing tendency to put children to work to help support the family. Laws differ in various states as to the limits of school age, the number of months of schooling required yearly, and the penalty for disobedience of the law. The number of years included under school age varies from four to ten. Attendance is required yearly for half the term, the full term or for a definite number of months. The penalty of disobedience is in most cases a fine, in some, imprisonment. In large cities the laws are enforced by truant officers; in rural districts or small towns the school board enforces the law. Defective children and those in ill health are of course exempt.

Compurgation, in early English law, a mode of trial according to which the accused was permitted to bring a number of friends to express a belief in his innocence. The compurgators, "oath helpers," were generally twelve in number. They were usually kinsmen or fellow guild members. They were not called as witnesses; the accused swore that he was innocent; the compurgators swore that they believed his oath to be "clean and without guile," and that they were satisfied of his innocence. The custom was brought to England by the Saxons. It appears to have been not uncommon among Teutonic tribes. It is believed that the "trial by jury," not infrequently attributed to King Alfred's reign, was simply compurgation, and that a person charged with crime could be acquitted by this method. Twelve men could clear an accused kinsman by stating under oath their belief in his innocence. Compurgation was abolished in the English courts by the Assize of Clarendon, 1166. This code was issued by Henry II with the advice and consent of a council of barons and prelates. An institution bearing some resemblance to a modern grand jury took the place of the compurgators. Compurgation in the courts of the church was abolished during the reign of Elizabeth. A curious survival of the practice of compurgation was the wager of law, whereby a person sued for debt could clear himself by bringing in eleven neighbors to testify under oath that they believed the defendant's sworn denial that he owed the sum in question. This relic of Saxon compurgation was abolished in 1833. The compurgators were not jurymen in the modern sense of the term, but compurgation was one of the elements which, in Norman hands, grew into the jury system.

Comte, kônt, **Auguste** (1798-1857), the founder of the system of philosophy known as Positivism, and the first systematic writer on sociology. His doctrine, in brief, is that intelligence, both of the individual and of society, has passed through three stages: first, that in which supernatural beings are thought to produce all phenomena; second, the state in which abstract forces, either mental or physical, are believed to be the causes of all activity; and, finally, the Positive stage, in which men give up inquiring into the causes of things and deal only with actual phenomena and the relations between them. His best known works are *Positive Philosophy, Positive Catechism,* and *Positive Polity.*

Comus, kō′mŭs, a mask by John Milton, presented before the Earl of Bridgewater at Ludlow Castle September 29, 1634. It was first printed in 1637. It is the longest and most important of Milton's minor poems. At this time the popularity of the mask, as a form of entertainment, was at its height. Charles I appointed the Earl of Bridgewater Lord President of Wales, the official seat of which position was Ludlow, Shropshire. The earl requested Henry Lawes, his children's tutor, to arrange a mask, or masque, as the word was then spelled, to celebrate his taking possession of Ludlow Castle. Lawes was something more than a tutor. He was also a musical composer of talent. He was the friend of Milton, whose assistance he asked in preparing the mask. Lawes explained the nature of the event to be celebrated, and told his friend what characters would be expected to take part. Milton wrote the poem. Lawes furnished the music and looked after the staging. He also took one of the prominent parts, that of the attending spirit. The part of "The Lady" was taken by the earl's fourteen year old daughter. The Lady's brothers were represented by his two younger sons. The other characters of the Mask are Comus, an enchanter, son of Circe, and Sabrina, a nymph. Comus carries off the Lady and places her in a beautiful palace under the spell of his magic art. Her brothers, led by the attendant Spirit, put Comus to rout; and with the aid of Sabrina, liberate their sister from the spell which holds her. That is all the story, but Milton, as Taine says, was able to "impress his own character even on ornamental poems which were only employed to exhibit costumes and introduce fairy tales." The poet makes use of his simple setting to glorify virtue; to show that the inherent power of goodness is proof against any evils that may assail it. He does this in a poem of lofty style and perfect finish, "the most perfect mask in any language."

It is interesting to note that the name *Comus* was not given to the mask until after Milton's death. Milton himself called it "A Masque Presented at Ludlow Castle, 1634, before the Earl of Bridgewater, Lord President of Wales." *Comus* was presented by the students of Tufts College, Massachusetts, in 1901.

Comus has been widely quoted. The last quotation given includes the closing lines of the mask, which embody the lesson of the poem, and, we may say, present Milton's guiding principle. The entire poem contains only 1,023 lines. There are few poems of equal length that will better repay careful reading.

He that has light within his own clear breast
May sit i' th' center and enjoy bright day;
But he that hides a dark soul and foul thoughts
Benighted walks under the midday sun.

Virtue could see to do what virtue would
By her own radiant light, though sun and moon
Were in the flat sea sunk.

So dear to heav'n is saintly chastity,
That when a soul is found sincerely so,
A thousand liveried angels lackey her,
Driving far off each thing of sin and guilt,
And in clear dream and solemn vision
Tell her of things that no gross ear can hear,
Till oft converse with heav'nly habitants
Begin to cast a beam on th' outward shape.

. . . Against the threats
Of malice or of sorcery, or that power
Which erring men call Chance, this I hold firm:
Virtue may be assailed, but never hurt,
Surprised by unjust force, but not enthralled:
Yea, even that which Mischief meant most harm
Shall in the happy trial prove most glory.

Mortals, that would follow me,
Love Virtue; she alone is free.
She can teach ye how to climb
Higher than the sphery chime;
Or, if Virtue feeble were,
Heaven itself would stoop to her.

CRITICISMS.

Judged in respect of its allegory, its pastoral beauties, its lyric strains, its epic flavor, its lofty philosophical tone, its "inevitable" lines or poetic "touchstones," Comus must be regarded as one of the most perfect fruits of Milton's genius.—Gayley and Young.

Comus, well worked out, with a complete originality and extraordinary elevation of style, is perhaps Milton's masterpiece, and is simply the eulogy of virtue.—Taine.

I did not perceive its faults.—Anon.

Concept. See THINKING.

Conch (kŏnk) **Shell,** a large spiral shell with a flowing lip, formerly much used as a dinner horn to call the men from the field. In Hawthorne's day the fish dealer announced his passage along the village street by blowing lustily on a conch

shell. The large pink conch of the West Indies is in demand for its pearl, and is much used for inlaid work, buttons, pearl handles and the like. Held to the ear, the conch gives forth a murmuring sound likened by the poets to that of the distant ocean.

But I have sinuous shells of pearly hue
Within, and they that lustre have imbibed
In the sun's palace-porch, where when unyoked
His chariot-wheel stands midway in the wave;
Shake one, and it awakens; then apply
Its polished lips to your attentive ear,
And it remembers its august abodes,
And murmurs as the ocean murmurs there.
—Walter Savage Landor.

Conclave, the college of cardinals assembled to elect a pope. The name is also applied to the apartment in which the election is held. The last conclave was held at Rome, July, 1903. It lasted for five days. Seven ballots were taken, resulting in the election of the patriarch of Venice, or Pius X. This was the first and only conclave in which a cardinal from the United States has ever taken part. See CARDINAL; POPE.

Concord, Massachusetts, a town on the Concord River, twenty miles northwest of Boston. It was settled in 1635, five years later than Boston. The present village had a population in 1920 of 6,461. It is situated in a beautiful farming region, forty minutes by rail from Boston. There are a number of manufactures. Concord is celebrated as the place of residence of a number of noted literary people. The gray stones of Sleepy Hollow burying ground near by bear the names of Emerson, Hawthorne, Thoreau, and Alcott, and their former residences are still pointed out. The "Old Manse," in which Hawthorne wrote his *Mosses,* is here. Ephraim Bull, the propagator of the famous Concord grape, lived here, and his grave is among those of the local celebrities.

At the beginning of the Revolutionary War, April 19, 1775, General Gage sent a command to destroy a large store of powder, balls, and muskets at Concord. The first American blood was shed at Lexington. The redcoats were met at Concord Bridge by the minute men who made a brief resistance, during which the first British fell. A century later, a bronze monument of a minute man on a granite pedestal was unveiled. On the pedestal is engraved the first stanza of Emerson's well-known poem, as follows:

By the rude bridge that arched the flood,
Their flag to April's breeze unfurled,
Here once the embattled farmers stood,
And fired the shot heard round the world.

See LEXINGTON; EMERSON.

Concord, capital of New Hampshire, and county seat of Merrimack County, located seventy-five miles northwest of Boston. As it is in the center of the white granite region the quarrying of that mineral is one of its leading industries. It has a variety of manufactures, among them furniture, pianos, silverware, carriages, flour, leather goods, cotton and woolen goods, shoes, etc. Its wide streets, handsome state and municipal buildings, and numerous parks give the city a pleasing appearance. The population in 1920 was 22,167.

Concord Grape, the leading American grape. In 1840 some boys scattered wild fox grapes about the place of Mr. Ephraim Bull of Concord, Massachusetts, and a number of grapevines grew up. In 1843 his attention was attracted by a bunch of grapes on one of these seedlings. Mr. Bull planted these grapes, and in 1849 he obtained a fine fruiting vine, which he named the Concord. From this vine fifty varieties of Concord grapes have sprung, and yet it was the grandchild of a wild grape from the woods of Concord. The original Concord vine is still growing, but it has been reduced to a mere sprout from the old root. Mr. Bull died in 1895, in his ninetieth year. It is to be regretted that one who conferred so great a benefit on his country, and who lived so unselfishly, should have ended his days in poverty.

Some eight years ago the editor of *Farm, Stock and Home* visited the old town of Concord, Massachusetts, around which are wreathed historical and literary laurels in great abundance and of rare value; yes, and of rare horticultural value too; for a humble little garden there was the birth place of the Concord grape. Visiting the old vine at the time mentioned, it was found to be in a woefully neglected state, as was the entire garden, and the always humble and modest home of the Concord's originator, Ephraim Wales Bull. Before leaving town the editor made

a vigorous protest to some of the town authorities against the treatment the old vine and home were receiving, and asserted that both, preserved and well cared for, would in the early future constitute a relic and attraction in the town that would prove more attractive to many pilgrims who annually visit it than any one of the many other relics it possesses.

Whether the protest had any effect or not, a recent visit disclosed a radical change in the condition and environment of the old vine. The last is now enclosed in a substantial trellis, it is kept fairly free from grass and weeds; the house and grounds are in a well kept condition; and a movement is on foot to erect a suitable monument to Mr. Bull, who "sowed that others might reap,"—the sentiment on the bronze tablet on the native granite boulder at the head of his grave.

To the trellis has been attached an ancient looking bit of board carrying the following inscription, cut by Mr. Bull himself in well-formed letters:

"I looked about to see what I could find among our wildings. The next thing to do was to find the best and earliest grape for seed, and this I found in an accidental seedling at the foot of the hill. The crop was abundant, ripe in August, and of very good quality for a wild grape. I sowed the seed in the autumn of 1843. Among them the Concord was the only one worth saving.—E. W. Bull."

This is the story of the origin of the Concord grape as recorded by its originator in a manner which made it desirable to tell the story in the fewest words possible.—S. M. Owen.

Concordance, a finding list of passages in an important work or series of writings. The principal words are arranged alphabetically. Under each, the various phrases are cited in which the word occurs. Perhaps the most celebrated is the concordance to the Holy Scriptures by Alexander Cruden, published in 1737. If we want to find an account of the destruction of the temple by Samson, we turn to *posts* and find the following: Judges xvi: 3, Samson took the two p. Turning to the third verse of the sixteenth chapter of Judges, we find the desired passage. Numerous concordances to Shakespeare's works have appeared. The best is that by John Bartlett, published in New York in 1894. The alphabetical index placed usually at the end of an author's work, is a brief concordance.

Concordat, a treaty between the pope as head of the Church of Rome and a civil government dealing with affairs of the Roman Catholic Church, within the state represented. As a rule the affairs so treated have both a temporal and religious aspect, though they may be either purely temporal or purely spiritual. The first such agreement was the celebrated Concordat of Worms between Pope Callistus II and Emperor Henry V, which settled a quarrel between church and state regarding the right of investiture. Two other well-known concordats are that of 1516 between Leo X and Francis I of France and the agreement between Pius VII and Napoleon in 1801. The latter concordat was abrogated in 1905 by the separation of church and state in France.

Concrete, an artificial stone. Builders' concrete of the present day is made of one part of Portland or hydraulic cement, three parts of sand, and six parts of crushed stone. The sharper, more angular, and clean the sand and stone, the better. These materials are mixed thoroughly with water, deposited either in molds to form slabs and blocks for curbing and paving, or else laid in the foundation or wall, and allowed to harden where the concrete is to remain. The ancient Babylonian, Egyptian, Greek, and Roman builders were familiar with this kind of material. The Romans, especially, employed concrete in the construction of foundations, piers, aqueducts, roadways, and bridges, portions of which still remain. In the early part of the nineteenth century the French constructed a breakwater to protect the harbor of Algiers. For want of quarry stone, blocks of concrete, weighing twenty-two tons each, were dropped into water fifty feet deep until they formed a long, irregular mole or protective wall. Concrete is used extensively in making a footing for brick or stone walls, especially in muddy, soft excavations where it is not practicable to reach bed rock. The foundation walls of many large structures are supported in this way. Of late concrete slabs of superior quality have come into favor for sidewalks, and the cheapening of Portland cement has suggested the use of concrete for entire buildings. It is not unusual to use concrete blocks in place of cut stone for door sills, window sills, window caps, and the like. See CEMENT.

Condé, kōn-dā′, a French family, a younger branch of the Bourbons, taking the name from the town of Condé. For an account of the most noted Prince de Condé (1530-1569), see HUGUENOTS.

Condenser. See LEYDEN JAR.

Condor, a large vulture-like bird of prey, inhabiting the Andean region of South America. It is the largest bird that flies. It measures over three feet from the tip of its bill to the end of its tail, and has a total wing expanse of nine or, in unusual specimens, fourteen feet. Its general color is a grayish black, terminating in a white, fluffy, silky collar or ruff, into which the bird withdraws its wrinkled head and neck for warmth and protection. The condor nests on the most inaccessible cliffs, laying two white eggs, four inches in length. The condor requires seven weeks to hatch its eggs, and the young must be fed for a whole year before they are able to fly. The condor soars at enormous altitudes—from 10,000 to 15,000 feet above the sea. It has a wonderful eye, and a keen sense of smell. The name condor is, in fact, derived from an old Indian word signifying a good smeller. Condors are usually seen in groups of three or four; never in large companies.

If the truth must be told, this bird, so noble in flight, is a greedy, repulsive creature close at hand. It descends to the plains upon the slightest promise of carrion. Dead animals of every sort are its choicest food. Condors gather in disgusting groups around a dead horse or cow, and tear the carcass, devouring such enormous quantities that they are at first unable to fly, and are killed by the Indians with clubs and stones. The condor is not especially courageous. It attacks little alpacas, wounded animals, or sick cattle, first tearing out the eyes and the tongue. Its nature seems to be very much like that of the alpine lammergeir to which, indeed, it is closely related.

The California condor, or vulture, is almost as large as the Andean. It formerly ranged from British Columbia southward, but is no longer seen north of Southern California. The eggs, now to be found only in the high coast Sierras, are quoted by collectors at $225 a nest.

> I was told by the country people in Chile that the condor makes no sort of nest, but in the months of November and December lays two large white eggs on a shelf of bare rock. It is said that the young condors cannot fly for an entire year; and long after they are able they continue to roost by night, and hunt by day with their parents. The old birds generally live in pairs; but among the inland basaltic cliffs I found a spot where scores must usually haunt. On coming to the brow of the precipice, it was a grand spectacle to see twenty or thirty of these great birds start heavily from their resting-place and wheel away in majestic circles.—Darwin.

Cone, one of the geometrical solids. A right circular cone is a solid occupying the space through which a right-angled triangle passes when swung clear around on one leg; that is to say, when it turns on its heel. The discussion which follows pertains to a cone of this sort, not to an oblique cone. The base of a cone is circular. The opposite point is called the apex. If a portion next the apex be cut off by a plane, the remainder is a truncated cone. The volume of a frustrum may be found by subtracting from the volume of the complete cone the volume of the portion that has been removed. The lateral surface of a cone equals the product of the circumference of its base by half its slant height. The solid content or volume of a cone equals one-third the product of its base by its altitude, not its slant height.

Every section of a cone passing through the apex is a triangle. By passing a cutting plane through a cone in various ways four different sections, called conic sections, may be formed. They are the circle, the ellipse, the parabola, and the hyperbola. If the cutting plane be parallel to the base, the section is a circle. If the cutting plane pass obliquely through the cone, not parallel to the base, the section is an ellipse. If parallel to the side of the cone, the section is a parabola. If perpendicular to the base, but not passing through the apex, the section is a hyperbola.

The circumference of the circle is, of course, everywhere equally distant from the center. Instead of a center, an ellipse has two points within, called foci. The sum of the distances from the foci to any point in the circumference is always the same. The farther the point is from one focus, the nearer it is to the other. In theory, the

ends of the arc of a parabola will meet somewhere in space if sufficiently extended. Comets are supposed to move in parabolic paths, by virtue of which they come within our vision at regular intervals of time. The cables of a suspension bridge when loaded uniformly are said by engineers to swing in the arc of a parabola. Leaving out of consideration the resistance of the atmosphere, a cannon ball or a jet of water from the spigot of a barrel describes a portion of a parabola. In theory, the arc of the hyperbola is never completed. A projectile following a hyperbola would travel on and on into space and never return.

Coney Island, a popular pleasure resort situated at the southwestern angle of Long Island. Suburban railways and lines of boats give ready access. Hordes of pleasure seekers from New York, Brooklyn, and Jersey City frequent the resort during the summer season. Henry Hudson is reputed to have landed here in 1609.

Confectionery, a general name given to a great number of sweetmeats, as candy, candied fruits, bonbons, caramels, sugar plums, and comfits. Originally the confectioner was a druggist who used sweets to disguise the taste of unpleasant medicines. The first candy then was medicinal, a nature still suggested by horehound, peppermint, wintergreen candy, lemon drops, cough drops, and the like. The next step appears to have been the drying of fruits in syrup or sugar. England led the way in making "boiled sweets." "Sweeties" is still the name used by British children. From England the making of candy spread to the continent. About 1850 candy appeared in Germany and in France, but the Americans inherited a "sweet tooth" from the mother country at an earlier date.

While it would be out of the question to enumerate the various kinds of candy, stick and drop, creams and chocolates,—a glance at the growth of the candy industry in the United States is instructive. During the half century elapsing between 1850 and 1919, the 383 candymaking establishments grew to 6,624. Three hundred million dollars are now invested in factories, and these are using $368,809,170 worth of sugars, syrups, flavors, and other material, and produce $637,209,168 worth of candy a year. At retail prices the American people, counting men, women and children, pay out an enormous sum per year for candy. According to the last census 95,648 people were earning wages in candy factories. No doubt twice as many more are engaged the whole or a part of their time in selling confectionery. At a low estimate, one person out of a thousand earns a living by making, shipping, or selling candy.

As before shown, there has been an enormous increase in the consumption of candy in the United States, and it is said that the people of the United States consume more than twice as much candy as all the rest of the world put together. Physicians are agreed that a moderate amount of pure candy, eaten immediately after meals, is rather beneficial than otherwise.

Confederacy, The, a name given to the union of the Confederate States of America. It was formed at Montgomery, Alabama, February 9, 1861, by South Carolina, Georgia, Florida, Mississippi, Alabama, and Louisiana. Jefferson Davis of Mississippi was elected president, and Alexander A. Stephens of Georgia, vice-president. The Confederacy was afterward joined by Texas, Arkansas, Tennessee, North Carolina, and Virginia. Missouri and Kentucky were prevented from joining by the efforts of the Unionists, aided by Federal troops. The capital was afterward removed to Richmond, Virginia. The constitution adopted was modeled on that of the United States. The president was to be chosen for six years, and was not eligible for re-election. Protective tariff, that is to say, a tariff for other purposes than revenue, was forbidden. Slavery was expressly recognized and safeguarded. The foreign slave trade, however, was prohibited.

The secession of these states, and the formation of a new union was in itself an express declaration of state sovereignty. The framers of the new constitution insisted that the right of a state to secede went without saying. They incorporated no specific statement of the principle. The Confederacy included a population of about 5,000,000 whites and 3,000,000

slaves. The government of the United States never recognized the Confederacy as a nation or its government as a government. It treated the people of the South as citizens in rebellion against the national authority. A cordon of ships and armies surrounding the Confederacy drew its lines tighter and tighter each campaign. With territory constantly diminishing, and under the necessity of defending itself on all sides, the Confederacy was practically in a state of martial law during its entire existence. Its constitution had little opportunity to be tested, yet its friends were of the opinion before the war ended that it did not give the central government sufficient authority. Certainly President Davis found it necessary to assume far more power than the constitution of the Confederacy contemplated.

Historians are inclined today to say that the Constitution left unsettled the question of the right of secession. Almost every important section of the country had threatened it at one time or another. By 1860, however, the people of the largest section of the Union had grown to regard the central government, that is to say, the president and Congress, as an authority to which each citizen owed personal obedience. The greater part of the Union had grown to consider the national authority superior to that of the state. That being the case, it was too much to expect that they would permit a minority, the small end of the country, to defy that authority. A citizen of Pennsylvania felt that a citizen of South Carolina must be made to obey the government which he himself obeyed, and the North being stronger than the South, made the South do it. The Confederacy lasted a little more than four years, after which it came to an end.

See CIVIL WAR; SECESSION; TOOMBS; DAVIS, JEFFERSON.

Confederacy, United Daughters of the, a patriotic society of women organized in memory of those who gave their lives, and those who suffered, for the South in the Civil War. It was organized in Nashville, Tenn., in 1894. Those eligible to membership are the direct female relatives and lineal descendants of those who worked for the Confederacy in any way. There are local chapters under state direction, and all in turn are controlled by a general organization. In 1918 the society had an enrollment of over 80,000 and about 1,300 local chapters.

Confederate Veterans, United, a patriotic society composed of veterans of the Confederate Army. It was organized in New Orleans, Louisiana, in 1889 for the purpose of renewing friendships formed during the war, gathering historical material concerning it, caring for the disabled, and assisting the widows and families of those who had lost their lives while members of the army. There are 1,600 local camps as they are called, the members of which number about 75,000. State organizations are known as divisions. The United Society holds annual reunions.

Confederation, Articles of. The written instrument which served as the constitution of the United States from 1781 to 1789, when it was replaced by the Federal Constitution adopted in 1787. At the outbreak of the Revolutionary War the American colonies, after separating from Great Britain, existed as independent governments. At the same time that a committee was appointed to draw up the Declaration of Independence another committee was appointed to formulate a plan which would give Congress more power than it had been able to exercise. The result of the labor of this committee was the Articles of Confederation which were presented to Congress July 12, 1776. The instrument did not finally pass that body, however, until November 15, 1777. It contained a provision requiring the consent or ratification of each state before it could become effective. The ratification was not completed until January 30, 1781, and the Articles became effective the following March.

The Articles designated the number of representatives which each state could have in Congress, but provided that each state could have only one vote. Congress was vested with power of declaring war, making peace and making treaties, but both the United States government and the governments of various states were given power to coin money and issue it. Every

state was allowed to regulate its own commerce and revenues. Congress could recommend expenditures but could not levy taxes, and every measure passed by Congress was required to receive the sanction of nine of the thirteen states before it became a law.

The Articles of Confederation are interesting because they formed a connecting link between the discordant governments of the states after the American Revolution and the Federal government under our present constitution. The Articles were weak in that they did not give enough power to the central government. As Justice Storey said, "Congress could recommend everything, but could do nothing." It was soon discovered that the United States could not exist as a nation under the Articles of Confederation and this discovery led to the Convention of 1787, which met for the purpose of revising these Articles. However, it soon found them so defective that it set them aside and prepared a new constitution. See CONSTITUTION.

Confession of Judgment, a method of allowing judgment to be entered against a person, when he has acknowledged in proper form that a claim is, or is about to become, due and owing to another, and that the latter may enter judgment for the amount in question. A judgment obtained in this matter is of equal force and as binding as if obtained through ordinary legal process. While the advantage is considered to be on the side of the person obtaining the judgment, taking into consideration the time and expense involved in litigation, it is also of advantage to the debtor, and saves him the costs of suit in the ordinary process of law. It is a common procedure in cases where a debtor desires to prefer a certain creditor, in order to give him priority over other creditors and the security which the judgment gives.

It differs from *cognovit* in several respects. A confession of judgment may be as valid for a claim which has not yet become due, as for future advances.

In some parts of the United States it is the custom to give a promissory note at the time of its inception the form and character of a confesison of judgment, whereby the holder of the note is given authority at maturity, or at a stipulated time thereafter, to have judgment entered without further process.

Confessions of an English Opium Eater, an autobiographical work by Thomas De Quincey, published in the *London Magazine* in 1821, and in book form in 1822. This work won immediate success, and is by far the most famous of all of De Quincey's writings. A second version, much longer than the first, but containing the whole of the earlier work, was written in 1855-6. *The Confessions* tells the story of the author's own experiences in acquiring and overcoming the opium habit. In it is found some of De Quincey's most valuable writing. It is original, polished, poetical, and often humorous. The long digressions are all interesting, are held under the author's control, and usually the return to the subject in hand is most happy. Hunter says, "It is only the story of the childhood of a man of genius; curious indeed, full of strangely pathetic incidents, but, from the ordinary standpoint, morally blameless." To the first part of *The Confessions,* as printed in the *London Magazine,* was appended the following editorial note, "The remainder of this very interesting article will be given in the next number." The October number accordingly contained Part II and Part III of *The Confessions,* with an editorial note by Thomas Hood as follows: "We are not often in the habit of eulogizing our own work, but we cannot neglect the opportunity . . . of calling the attention of our readers to the deep, eloquent, and masterly paper which stands first in our present number." See DE QUINCEY.

Confucius, kon-fū′she-ŭs (550-478 B. C.), a Chinese religious teacher. His Chinese name was Kung, to which *fu-tse′*, meaning reverend doctor, was added. Confucius is the Latinized form of Kung-fu-tse′. He was of royal descent, but was raised in poverty by his mother. He was educated for office in the learning of China. His first official commission was that of inspector of the grain markets. He taught school for a time. One remark of his is

worth remembering. "When I have presented," said he, "one corner of a subject, and the pupil cannot, of himself, make out the other three, I do not repeat my lesson." At an early age he began to visit the various provinces, preaching a system of morals to which he won many adherents. Confucius is credited frequently with the authorship of the nine classics which form the canonical books of the Chinese. Although, as compiler, commentator, or teacher, he left his impress upon all of these, he wrote but one, *Spring and Autumn Annals,* the last of the Five Classics. His disciples drew up his teachings and sayings in what are known as the Four Books, which, with the Five Classics, make up the nine canonical books. Confucius made no pretense to divinity. He taught a simple, plain code of practical ethics, remarkable for an almost total want of theology or creed. "To give one's self earnestly to the duties due to man, and, while respecting spiritual things, to keep aloof from them, that may be called wisdom," said he. He has an immense following in the Orient. The adherents of Confucius, chiefly in China and Japan, are estimated at no less than 256,000,000. See CHINESE EMPIRE; LITERATURE, CHINESE.

Conglomerate, a rock commonly called "puddling stone," formed of pebbles cemented together by finer-grained rock material. Conglomerates can form only in shallow waters along shores, so when found in the strata of the earth's crust they indicate that, in some past age, the waters here encroached upon the land. The pebbly beaches now being formed will become conglomerates when consolidated. This rock generally separates one geological formation from another.

Congo, or **Kongo,** a river of equatorial Africa. The length is about 3,000 miles. In volume, the Congo is the second river in the world, ranking ahead of the Mississippi, and next the Amazon. The Congo leaves Lake Bangweolo in northeastern Rhodesia, near the line of twelve degrees south latitude. It describes an immense arc to the northward, crossing the equator twice, and empties into the Atlantic Ocean at the line of six degrees south latitude. The last section of the course is ten miles in width. The mouth of the river was known to the Portuguese in the fifteenth century. Settlements were made on that part of the coast.

In 1876-7 Henry M. Stanley followed the outlet of the Bangweolo clear to the Atlantic Ocean. He was the first white man to visit the middle Congo, and, indeed, the first to make known that the head waters and the lower course of this river were one. Stanley desired to call the river the Livingstone.

The Congo is navigable for seagoing ships to the port of Boma, 110 miles from the sea. A railway leads from Boma around 100 miles of cataracts to Stanley Pool. Pool steamers ascend for 1,000 miles farther to Stanley Falls. There are several large tributaries. It is thought that the main stream, with its tributaries, affords in all over 7,000 miles of navigable waterway. There are two rainy seasons, extending from October to December, and from February to May.

The basin of the Congo is too large to be described in a few words. Its forests rival those of the Amazon. The entire area comprises over a tenth of all Africa. Estimates place the population of this vast region at no less than 30,000,000, chiefly negroes, known racially as Bantus.

French Congo lies on the north bank of the river, near the coast. Portuguese Congo or Angola lies on the coast south of the mouth. Belgian Congo comprises the greater portion of the interior, with a small strip along the river to the coast. A part of the head waters, as stated, lies in Rhodesia.

Congo Free State. See BELGIAN CONGO.

Congregationalists, The, a religious denomination. The Congregationalists differ from the Presbyterians less in point of doctrine than in form of church government. Each Congregational church has authority to elect its own governing body, select its own pastor, and determine its own form of worship. The Congregationalists of England are often known as Independents. Congregationalism in America had its rise in New England in the settle-

ment of Plymouth, 1620. Yale, Dartmouth, Amherst, and Oberlin are among the older Congregational colleges. There were in the United States about 5,924 churches with a membership of 819,225. In Canada for the same year there were 164 churches with a membership of 13,210. There are churches of this denomination in Great Britain, Australia, China, India, South Africa and Japan, also the Scandinavian countries. See PILGRIMS; UNITARIANS; PLYMOUTH COLONY.

Congress, the lawmaking body of the United States. The Constitution provides that the Congress shall consist of a Senate and a House of Representatives. Our Congress is founded on the British Parliament. The members of the British House of Lords hold their positions for life. Our senators are chosen by vote of the people for a period of six years. The members of the House of Commons are elected to serve for seven years, or until the ministers (cabinet) decide to dissolve Parliament and order a new election. Our representatives are chosen by popular vote to serve for two years. In order that small states may not be crowded to the wall by the large ones, they are allowed equal representation in the American Senate. The number of representatives sent by each state is proportionate to the population. The vice-president of the United States presides over the sessions of the Senate. The House of Representatives chooses a speaker from its own number. The life of a Congress is for two years, the length of time for which representatives are elected. A Congress begins with the inauguration of a president. There are two Congresses for each full time administration. The old Congress expires on the fourth of March in odd numbered years. A new Congress, however, does not meet until the second Monday in the following December, unless called together by the president.

The legislative body corresponding to our Congress is, in Austria, the Reichsrath, or Imperial Council; in Sweden, the Diet; in Norway, the Storthing, or the great thing; in the Netherlands, the States General; in France, the National Assembly; in Spain, the Cortes, or courts; in Brazil, the National Congress; in Canada, the Parliament consisting of a Senate and a House of Commons; in the Commonwealth of Australia, the Parliament, consisting of the Legislative Council and the Legislative Assembly; in Germany, the Constituent Assembly.

Turkey have adopted constitutions. The Russian assembly is known as the Soviet; the Turkish as Parliament.

The following table gives the number of representatives from each state according to the apportionment following the caucus of 1920. The next apportionment will not be made until after the census of 1930. Until that time Congress will consist of 96 senators, 435 representatives and 2 territorial delegates representing Alaska and Hawaii, respectively, unless these territories become states the territorial delegates have no vote.

States	Senate	House	Elec. Vote
Alabama	2	10	12
Arizona	2	1	3
Arkansas	2	7	9
California	2	14	16
Colorado	2	4	6
Connecticut	2	6	8
Delaware	2	1	3
Florida	2	4	6
Georgia	2	12	14
Idaho	2	2	4
Illinois	2	27	29
Indiana	2	12	14
Iowa	2	10	12
Kansas	2	7	9
Kentucky	2	10	12
Louisiana	2	7	9
Maine	2	3	5
Maryland	2	6	8
Massachusetts	2	16	18
Michigan	2	13	15
Minnesota	2	10	12
Mississippi	2	7	9
Missouri	2	14	16
Montana	2	2	4
Nebraska	2	5	7
Nevada	2	1	3
New Hampshire	2	2	4
New Jersey	2	13	15
New Mexico	2	1	3
New York	2	43	45
North Carolina	2	11	13
North Dakota	2	3	5
Ohio	2	24	26
Oklahoma	2	8	10
Oregon	2	3	5
Pennsylvania	2	36	38
Rhode Island	2	2	4
South Carolina	2	7	9
South Dakota	2	3	5

States	Senate	House	Elec. Vote
Tennessee	2	10	12
Texas	2	19	21
Utah	2	2	4
Vermont	2	1	3
Virginia	2	10	12
Washington	2	6	8
West Virginia	2	6	8
Wisconsin	2	11	13
Wyoming	2	1	3
Total	96	435	531

Territories	Delegates
Alaska	1
Hawaii	1

Congressional Record, a journal of the proceedings of the United States Congress. Before 1799 the Senate held secret sessions only, but since then proceedings have been made public, except in the case of executive sessions, through the "Visitors' Gallery" and the Congressional Record. The journal is not an accurate record of actual proceedings, for debaters may revise their speeches before they are printed, and speeches never delivered appear under "Permission to Print" as if they had been given on the floor and reports of debates are revised by participants before being printed.

Congreve, William (1670-1729), an English dramatist. He holds first place among the writers of comedy during the Restoration period. The romantic comedy of which *As You Like It* is the best example had now gone entirely out of fashion. In its place, we find plots drawn often from Spanish and French sources, vivid pictures of the fashionable life of the times, a great deal of witty dialogue, with much that is cynical, coarse, and even immoral. The other writers of this group are William Wycherly, John Vanbrugh and George Farquhar. Congreve was "courted, flattered, and famous" in his own day. He was supreme in the "comedy of repartee." *Love for Love* and *The Way of the World* are two of his comedies. He was a friend of Dryden and paid high tribute to him on the latter's death. See DRAMA; COLLIER.

QUOTATIONS.

Music hath charms to soothe the savage breast.

Defer not till tomorrow to be wise,
Tomorrow's sun on thee may never rise.

Conic Sections. See CONE.

Conifers (Latin, *cone bearers*), a large and important family of shrubs and trees. They produce naked seeds protected by corky or resinous scales in the form usually of a cone. A few, as the juniper, produce berries. Most conifers are evergreen; that is to say, they retain their old leaves, usually needle-shaped, over winter at least, until new leaves have made their growth. Conifers are not all evergreens. Tamarac drops its leaves in the fall. Comparatively few evergreens, holly for instance, are conifers; but the term evergreen has come to mean conifer and is so used in horticultural manuals, as an evergreen hedge, an evergreen windbreak, etc. In this use of the word there are about 300 evergreens in the world and about 100 native to North America, with 300 or 400 nurserymen's varieties. The beauty of evergreens lies in their natural shape. They should never be trimmed up like an ash or an elm. Their green foliage is pleasing to the eye at all seasons. Evergreens distributed with judgment impart to private grounds and dooryards an air of good taste, and give farms an appearance of comfort and prosperity that can be had so inexpensively in no other way.

Conjunctivitis. See OPHTHALMIA.

Con'kling, Roscoe (1829-1888), an American statesman, born at Albany, New York, later becoming district attorney for Oneida County. He was elected mayor in 1858, in the same year was sent to Congress, and in 1867 was chosen for the United States Senate. He was a stanch friend of President Grant, being one of his main supporters for a third term in 1880. With his colleague, Thomas C. Platt, he quarreled with President Garfield, of Civil Service Reform fame, the senators insisting upon their right to control federal appointments within their state. Both resigned their seats finally, and appealed to the next legislature for re-election in vindication of their attitude, but were unsuccessful. Mr. Conkling then practiced law in New York, declining the nomination for justice of the Supreme Court. His imperious disposition made many enemies. See GARFIELD; CIVIL SERVICE.

Connaught, Arthur, Duke of (1850-), an English soldier and statesman, governor-general of Canada. He is Prince Arthur, the third son of Queen Victoria. Before coming to Canada as successor to Earl Grey, his Royal Highness was first and foremost a soldier. He has served in various positions of high rank in the British Army, and with his wife, Princess Louise of Prussia, has traveled extensively in out-of-the-way places, spending comparatively little time in England. Their three children were reared with great simplicity. When the Duke and the Duchess of Connaught went to India, where he was to act as field-marshal, the children were left with Queen Victoria, who was living then in great seclusion. The youngest child, Victoria, is now of age. The duke is noted for his reserve, which some persons attribute to extreme shyness, his hatred of publicity, and his great executive ability.

Connecticut, kŏn-nĕt′ĭ-kŭt, a New England state. It lies on Long Island Sound, between New York and Rhode Island. With the exception of two jogs in favor of Massachusetts, the northern boundary is formed by the line of 42° 30′ north latitude. The general outline of the state is an oblong, 88 miles in length, and of irregular width. Area, 4,820 square miles. Capital, Hartford. Eight counties. Population in 1920, 1,380,385. Two railroads with 2,065 miles of track. The name of the state is that of its principal river. It is a Pequot word, meaning the long river. Nicknames are "The Wooden Nutmeg State," "The Land of Steady Habits," "The Constitutional State."

The first account of the country was published by Hudson and Adrian Block, Dutch navigators. Plymouth Colony established a trading post on the Connecticut in 1633. Settlement was made at Weathersfield in 1634, at Windsor in 1635 and at Hartford in 1636 by colonists from Massachusetts Bay. Trouble ensued with the Pequot Indians, but, as the natives were armed at best with bows and arrows, midnight massacres and scalping were soon brought to an end. In May, 1637, Captain Mason and a band of ninety men armed with guns surprised the natives in their stockade at Groton, set fire to their wooden stronghold, burned them out like rats, and killed six hundred men, women, and children who endeavored to escape. The pious chroniclers report a cessation of hostilities.

In 1639 the settlers, finding themselves beyond the jurisdiction of Massachusetts, adopted a constitution, said to be the first ever prepared for their own use by a self-governing people. Deriving all its authority from the people, it contained many democratic features, such as annual elections, and vote by ballot; but, upon the whole, it was made up by selecting the more liberal of the practices actually in use at the time in the Massachusetts Colony. In 1662 a charter was granted the colony by Charles II. Much against its will New Haven Colony on the sound was included. This charter was suspended for a short time during the administration of Andros. Otherwise it served as the fundamental law of Connecticut until 1818. The oft quoted Blue Laws of Connecticut are now admitted to have been in part a mere literary forgery.

Connecticut has a record for patriotism. A full quota of men and money was supplied during the intercolonial wars. At the outbreak of the Revolution Jonathan Trumbull of Connecticut was the only colonial governor in full accord with the American patriots,—the only one who was not asked or forced to resign. He sent forward men and provisions in a most energetic manner, and stood on such intimate terms of confidence with Washington that the expression, "Brother Jonathan," is said to have arisen from Washington's having referred to him, then governor, in that familiar, trustful way. About the only reason for regret in this connection is the circumstance that Benedict Arnold was a native of this state, a fact that resulted in the disgraceful raids of Tryon and of Arnold himself, when seaboard towns were burned and the rules of civilized warfare disregarded. Although the War of 1812 ruined a prosperous trade with the West Indies, local opinion was by no means unitedly in favor of the Hartford Convention of 1814-15. During the Civil War, Connecticut furnished 54,882 volunteers, far more than her share.

From the first, the state has been noted for frugality, industry, and thrift. Agriculturally, the state may be divided into four regions. A sandy shore along the sound; the valley of the Connecticut; the uplands east of that river; and the region west of the valley. The valleys of the Connecticut and the Housatonic are noted for the production of a cigar tobacco. Small fruits, orchard fruits, and vegetables are raised for city markets. Dairying is an important industry.

An unprofitable copper mine, opened at Granby in 1705, was the beginning of the manufacture of brass, in which the valleys of the Housatonic and Naugatuck now lead the world. The Yankee peddler, with his tin and wooden ware, is a product of the state, dating from 1770. It is but fair to say he peddled far better wares than are now on the market. The cannon, balls, chains, wagon tires, and camp kettles of the Revolution were made here from native ore found at Salisbury. Paper, American clocks, watches, sewing machines, vulcanized rubber, and electro-plating owe their early reputation to Connecticut. In proportion to population, more patents have been issued to the inhabitants of Connecticut than to the inventors of any other state.

Manufacturing is the principal industry of the state, and Connecticut is one of the greatest manufacturing states in the Union. In naming the most important towns—Danbury, Waterbury, Bridgeport, Hartford, New Britain, etc.—a host of commodities known to all comes to mind. Ships, watches, hats, shoes, firearms, buttons, clocks, cutlery, machines, brass and copper wire, bronze ware, bicycles, rubber goods, textiles and machinery make only a partial list of Connecticut manufactures.

In return for relinquishment of territory in Wyoming Valley, Connecticut received a grant of 3,500,000 acres of public land in northeastern Ohio, including the present site of Cleveland. This tract was known as the Western Reserve. About half a million acres was given to those who suffered from the British during the Revolution; the remainder was sold to settlers for the benefit of the Connecticut school fund, now in excess of two million dollars. The income from this fund, over one hundred thousand dollars, is turned over to the towns to assist in financing the common schools. Higher education is provided for by endowed institutions, chief among which are Yale University at New Haven, Wesleyan at Middletown, and Trinity at Hartford. The state maintains an agricultural college at Mansfield and four normal schools at Danbury, New Britain, New Haven and at Willimantic. A newer institution of higher education is the Connecticut College at New London.

STATISTICS. The following statistics are the latest to be had from trustworthy sources:

Land area, square miles	4,859
Water area, square miles	145
Forest area, acres	1,500,000
Population (1921)	1,380,631
White	1,359,585
Negro	21,046
Chief cities:	
New Haven	162,537
Hartford	138,036
Bridgeport	143,555
Waterbury	91,715
New Britain	59,316
Stamford	35,096
Meriden	29,867
Norwalk	27,743
New London	25,688
Number of counties	8
Members of state senate	35
Members of house of representatives	258
Representatives in Congress	6
Salary of governor	$5,000
Assessed valuation of property	$1,935,355,236
Bonded indebtedness	$14,291,100
Farm area, acres	1,898,980
Improved land, acres	701,086
Corn, bushels	3,848,000
Wheat, bushels	50,102
Oats, bushels	330,000
Rye, bushels	95,000
Tobacco, pounds	45,074,000
Domestic animals:	
Horses	39,000
Milk cows	117,000
Other cattle	80,000
Sheep	22,000
Swine	78,000
Manufacturing establishments	4,878
Capital invested	$1,232,324,318
Raw material used	$685,937,199
Operatives	292,672
Output of manufactures	$1,392,431,620
Teachers in public schools	7,343
Pupils enrolled	258,389

Connecticut River, the longest river in New England, rises in New Hampshire, flows south between that state and Vermont, crosses western Massachusetts and central Connecticut, and empties into Long Island Sound. Its length is 400 miles, the lower fifty of which are navigable for large steamers; and from Hartford to a point within the borders of Massachusetts, the river has been canalized and made navigable for small craft. There are many falls in the river, some of which—such as those at Windsor Locks, Conn., Bellows Falls, Vt., and Turners Falls and Holyoke, Mass. —have been harnessed in the service of industry.

Connective Tissue, the tissue of the body that has the widest distribution. It occurs in many modifications and specializations, but its function is always to support and connect the other tissues of the body. Connective tissue is rich in lymphatics, but deficient in nerves and in blood supply. Of the numerous types of this tissue, the most important are: White fibrous connective tissue, constituting the subcutaneous connective tissue and intramuscular tissue, and the ligaments and tendons, as well as the framework of all the bodily organs; yellow elastic connective tissue, sometimes occurring in a pure form in the body, and in that case composed of large and coarse fibres; developmental forms of connective tissue—mucous and embryonal; cartilage; bone and dentine; fat; and neuroglia, the connective tissue of the nervous system.

Connor, Ralph. See GORDON, CHARLES WILLIAM.

Consciousness, a term for which no satisfactory definition has been stated. When life or mind is aware of itself it is self-conscious.

But the word consciousness is popularly used instead of self-consciousness. A person is said to "lose consciousness," or to "become unconscious" during sound sleep or when in a faint. What is lost at such times is self-consciousness. The stream of consciousness does not stop; it merely runs at slower rate or lower ebb. This lower ebb, when mind is not aware of itself, has been called the sub-conscious experience. Consciousness then is the larger term; it includes both self-conscious and the sub-conscious. The vital processes seem to depend upon the stimulus of the subconscious mind, so complete loss of consciousness might mean death of the body.

Just when a human being becomes self-conscious no one knows. Many impressions are received subconsciously long before a child is aware of itself, perhaps even before birth. It is not so important to know when a child becomes self-conscious as it is to remember that he is *always* conscious, that even during sleep sub-conscious mind is recording impressions which may help to determine responses he will make during his most self-conscious moment. Unruly children have been helped to better living by means of positive suggestions given during their sleep. Much usually attributed to organic or physical inheritance is due to sub-conscious impressions. On the other hand it is worth while to know that when the mind is aware of itself it can give suggestions or directions which will affect the activity of the sub-conscious experience. Since sub-conscious mind controls vital functions, the right self-suggestions accompanied by belief in their power will improve health and increase mental activity. Many minds through fear of illness and expectation of failure are unintentionally giving themselves negative suggestions. Such suggestions determine sub-conscious attention, for attention is merely the focus of consciousness. A change in attention means a change in the stream of consciousness. Whatever the self-conscious mind attends to and expects, the sub-conscious seems bent upon bringing to fruition.

Conscription, or Drafting, terms signifying the compulsory enrollment of men for military service. Conscription of one or another kind is as old as recorded history. It was practiced by the Persians and the Romans, and was in vogue in Europe, excepting England, for many years previously to the World War. The modern form of conscription—compulsory military service for all males between certain ages who are physically fit—was first introduced in France; Germany adopted it and carried it further, perhaps, than did any other

country. A peculiarity of the practice is that it always has been applied, generally, to military as distinct from naval service.

In England, the United States and Canada conscription has never been popular. The comparatively small standing armies of the United Kingdom had always been made up of volunteers, and the Canadian military forces were also volunteer forces. Prior to the Civil War in the United States conscription was not practiced; but the North was compelled to resort to this method of raising armies, to avoid defeat by the South.

During the World War, however, England, Canada and the United States were forced to draft men into service in order to defeat Germany. It was found that the military machinery of all these countries was inadequate and that volunteers were not responding as fast as they were needed. The Selective Conscription Bill was passed in the United States in May, 1917, and a similar bill was passed in Canada in the same year. Recourse was had to conscription in England at an earlier date. In all of these countries, however, compulsory service was only a temporary measure; the volunteer method has obtained since the close of the World War.

Conservation, the act or policy of conserving, protecting or preserving; especially a government policy for the protection or preservation of natural resources. In the first decade of the twentieth century, largely at the instance of President Roosevelt, the people awoke to the fact that there had been great waste of their natural resources, and that new methods of production and consumption were necessary in order to conserve these important sources of national wealth. The natural resources of a nation may be broadly classified as its fertile soil, its water supply, navigable waters and water powers; its mines, standing timber, fisheries, etc. All these constitute what may be called natural wealth, which may be converted into actual wealth by the energy of man. European nations long ago realized the importance of a government policy and methods that would conserve all such resources so that they would not become exhausted by prodigal use. But in the United States, the forests of Michigan and Minnesota, for example, have been largely stripped of their standing timber; useful animals, like the buffalo, and several species of valuable birds have been ruthlessly slaughtered to the point of extinction; and water powers of untold value to industry have been allowed to go to waste.

Both the Federal government and state administrations have at length taken steps to check the waste of natural supplies of raw material and deterioration of the soil by the rapid destruction of the forests. The first great step toward a conservation policy was taken by a conference of governors of the states, which met at the White House, Washington, in May, 1908, at the call of Mr. Roosevelt. This conference unanimously adopted a declaration recommending the appointment by each state of a commission on the conservation of natural resources, to cooperate with a similar National Commission. A joint committee on conservation is now directing the conservation work in the United States. This is composed of members of the United States Senate and House of Representatives.

Canada and Mexico were invited to join with the United States in this movement, and in February, 1909, a North American Conservation Conference assembled in Washington. This conference united in a declaration of principles which said among other things:

We recognize the mutual interests of the nations which occupy the continent of North America and the dependence of each upon its natural resources. We agree that the conservation of these resources is indispensable for the continued prosperity of each nation. * * * We recognize as natural resources all materials available for the use of man as means of life and welfare, including those on the surface of the earth, like the soil and the waters; those below the surface, like the minerals; and those above the surface, like the forests. We agree that these resources should be developed, used and conserved for the future, in the interests of mankind, whose rights and duties to guard and control the natural sources of life and welfare are inherent, perpetual and indefeasible. We agree that those resources which are necessaries of life should be regarded as public utilities, that their ownership entails specific duties to the public, and that, as far as possible, effective measures should be adopted to guard against monopoly.

Conservation then became for awhile a leading policy of the United States government, and greater care has been exercised in preserving the forests since that time. Large sections of the country have been set apart as forest preserves; the national park system has been extended; and the development of water powers is now going on and has already added millions of horsepower to the resources of industry. The mineral resources of the country are also receiving more attention, with the object of preventing waste of coal, iron, etc., and every state has conservation laws for the preservation of fish and game.

As one feature of the conservation movement, the United States Forest Service, under the leadership of Gifford Pinchot, later (1922) elected governor of Pennsylvania, developed from a minor division in the Department of Agriculture to an organization administering nearly 200,000,000 acres of forest land in the public interest. It employs several thousand persons, as forest rangers and in other useful capacities, and has aided greatly in the growth and development of the West. Mr. Pinchot has defined conservation as "the application of common sense to common problems for the public good."

In Canada, the work of conserving the natural resources is conducted by an official body known as the Commission of Conservation, consisting of twenty members appointed by the Governor-in-Council and working largely through committees.

See WATER-POWER; FORESTRY.

Conservation of Energy. See ENERGY.

Conservatives, in England and Canada, the name applied to the political party that believes in keeping in force those governmental measures which have been tried and proved successful. See LIBERALS.

Conservatory, a term given to plant-houses, where plants are raised for ornamental purposes. The modern interpretation of conservatory usually is a place where rare and exotic plants are grown, while the structures where plants are grown for transplanting, etc., are usually referred to as hothouses. Conservatories are frequently connected with private houses, while in large cities the public parks usually have conservatories or hothouses where foreign trees, shrubs and flowers are grown.

Constance, German **Konstanz,** a city of Baden. It lies at the northwest end of Lake Constance at the outgo of the Rhine. Constance is an old city. In the sixth century it became the seat of a bishopric, which was suppressed in 1802. Constance was a free town of the empire down to 1548. After the Reformation it was subject to Austria; since 1805 it has been a town of Baden. Population, 17,000. There are cotton mills and important manufactories of chemicals and carpets. There is frequent steamship service between Constance and other lake ports. There are several lines of railway. Constance is the center of considerable trade. The city is situated beautifully on the immediate shore of the lake.

Constance, Lake, a fine body of water on the borders of Switzerland, Germany, and Austria. Length, 40 miles; width, 9 miles; greatest depth, 912 feet; altitude, 1,385 feet. The Rhine flows through the lake from southeast to northwest. The waters of the lake are of a beautiful pale green hue, and are well stocked with fish. The waters are subject to a sudden rise due to some underground cause. In 1770 a rise of twenty feet inside of an hour is on record.

Constantine, surnamed the Great. Emperor of Rome from 306-337 A. D. Under his rule the warring and seditious elements of the Roman Empire were subdued. His reign is noted for two events of importance, —the adoption of Christianity as the regular religion of the empire, and the removal of the capital to Constantinople. In 313 he issued the Edict of Milan. "We grant likewise to the Christians and to all others, free choice to follow the mode of worship they may wish, that whatsoever divinity and celestial power may exist may be propitious to all that live under our government." This edict put an end to the terrible persecutions of the Christians, and marked the beginning of atrocious persecutions by them; showing that human nature cannot be changed by an edict. In 328 Constan-

tine ordered the old city of Byzantium rebuilt. He named the city for himself, Constantinople, and removed the seat of his government thither. The arch of Constantine, erected in that emperor's honor in Rome 315, is one of the best preserved of Roman antiquities.

Constantine I, (1868-1923), King of Greece, who succeeded to the throne on the assassination of his father, George I, in 1913. He married Princess Sophia, a sister of the former German Emperor. He became very popular with his people, especially for his brilliant services in the Balkan Wars. At the outbreak of the Great War Constantine was placed in a difficult position. He had received a military training in Germany, and his family connections were German, both of these facts causing him to favor the Central Powers. A strong faction of the Greeks favored the Allies, Venizelos, recognized as one of the great statesmen of Europe, being their leader. Finally Constantine and his eldest son, because of their German sympathies, were forced by France and Great Britain to renounce their rights to the Greek throne, when Constantine abdicated and retired to Switzerland. He was succeeded by Alexander, his second son. After the death of Alexander in 1920 Constantine was recalled to Greece by a plebiscite, but he was not recognized by any of the Allied Powers. In 1921 he left for Smyrna to take command of the Greek army in Asia Minor in a renewal of the war against Turkey. In this war the Greek army met with overwhelming defeat and was put to flight, the loss of Smyrna and Thrace following. So for the second time (September 27, 1922) Constantine abdicated and went to Italy. He died at Palermo January 11, 1923, it is said of a broken heart caused by the Greek executions, when several of his most devoted friends and followers were slain.

Constantinople, until 1918 the capital of the Turkish Empire, Latitude, 40° N.; longitude, 28° 59′ E. It is situated on the European side of the Bosporus, between the Sea of Marmora and an inlet of the Bosporus, called the Golden Horn. The city has a water frontage on three sides of eight or nine miles in extent. The city proper thus occupies a triangular peninsula. Extensive suburbs are located across the Golden Horn and on the Asiatic side of the Bosporus. The city contains a great number of fine mosques with dome-shaped roofs, the most famous, though not the largest, of which is the mosque of St. Sophia. It has twenty domes. It is said to be the most ancient Christian church in existence; but it was converted into a Mohammedan mosque in 1453. Its walls are decorated with frescoes. Another feature of the city is the bazaars. They remind the traveler of booths at the European fairs. The Grand Bazaar consists of several long avenues arched with brick and lighted by apertures in the vaulted roof. Cross-legged Turks sit smoking their pipes, waiting for custom. They ask several prices for their goods, but are willing to take what is right. Ribbons, gems, clothing, perfumes, embroidery, lace, silk, rugs, in fact all sorts of oriental goods, are exposed in a bewildering and attractive array. One needs to leave his money at the hotel, in order not to spend it. Perhaps the chief center of attraction, to European visitors at least, is the palace or seraglio where the Sultan lived. It commands a magnificent view of the Bosporus, the Golden Horn, and the cypress-covered hills of Scutari. With its grounds, it occupies a large area, including gardens and groves. The sultan's many wives lived in the harem, surrounded by beautiful landscape gardens. The principal entrance is known as the Sublime Porte, a term not infrequently applied to the sultan himself. It means simply the high door, or lofty entrance. Aside from the attractions mentioned, the city is a tangle of narrow, dark, incredibly filthy, ill paved streets, running in the most irregular fashion. The city is abundantly provided with good water from public fountains, whence it is carried into the houses for domestic purposes.

The Golden Horn is the port of the city. It is about six miles long and half a mile wide. Vessels from the Black Sea, the Mediterranean, and London crowd its wharves. Forty-two vessels on an average come in daily. Immense quantities of

wheat, iron, furs, tallow, lumber, cotton cloth, woolen goods, silks, jewelry, groceries of various sorts, furniture, oriental rugs, wool, and dyestuffs change hands here annually.

Constantinople is connected by rail with Vienna, Paris, and other capitals of continental Europe. A railway from the other shore of the Bosphorus extends to Bagdad on the Persian Gulf, and another extends towards Mecca. Since the revolution of 1908 and 1909, the city has been improved. Streets have been broadened and paved, many old wooden buildings have been replaced with concrete structures, and the city has been generally cleaned up and made more sanitary.

At present, 1923, Constantinople is inhabited by about 500,000 Turks, the remainder being made up of Greeks, Armenians and Jews. The University of Constantinople, founded in 1900, now comprises 5 faculties: Arts, theology, law, medicine and science. In addition, there are a large number of special schools belonging to the State, or to the recognized communities, among which are an Imperial art school, a Greek National school and a Greek theological seminary.

Post War Conditions. To the foreigner, Constantinople of today presents a curious mixture of old and modern customs and facilities. For instance, by the side of electric street railways, may be seen men in curious garments driving sheep across the famous Galata Bridge. There is a never-ending procession of peasants and pashas, Arabs and Albanians, black eunuchs and white Europeans, hamals, or human pack animals, and harem ladies, Fords and camels, ox-carts and motorcycles, all these presenting a kaleidoscopic panorama. Old Turkish customs and modern methods are curiously intermingled in the police of the city. Any laxity of conduct on the part of members of new national Turkey is strictly censured and punished, though great leeway is given to infractions by Christian soldiers and sailors. The latter are found in the European section of the city, and here are encountered conditions that are the despair of Christian missionaries working in the city. A recent writer in the *Review of Reviews* states "Under the protecting cloak of Christian nations, these 'Christian' peoples have made the ancient capital of the Christian world a moral plague spot, and no presentation of present-day Constantinople would be true to the facts which did not at least hint at this aspect."

It is stated that the missionaries in Constantinople are looking forward hopefully to the day when the Allies move out of the city, and Turkish sovereignty is unimpaired, for then the prohibition laws now prevailing in Anatolia will also be enforced in Constantinople. Angora has announced that prohibition will soon be enforced in Constantinople.

An onlooker in Constantinople of today, sees to the left, up the Bosporus, the mighty armada of the nations' navies, but for the gratification of his artistic sense he will look towards the right, around the curve of the horn, where may be seen the native sailboats, which are a delight to the eye. To the American the Old Stamboul bazaars are an unfailing joy, and much money is left there by foreign officers and tourists. The troops of the Allies are quartered here in force, but they no longer control the city, which is under the surveillance of the Turkish police, though there is the British military police and the American naval patrol. The estimated population of Constantinople is 1,000,000. See Angora; Turkey; Bosporus.

Constellation, a group of stars. One observing the sky on a clear night cannot fail to observe that the bright stars form more or less noticeable groups. The best known to young people is perhaps that of the Great Dipper, the outer stars of which point to the pole star. The belt of stars through which the sun appears to move annually was divided into twelve groups or constellations, probably by the Babylonians, certainly prior to the earliest extant history. The earliest works on the subject, of which we have any knowledge, were written in the fourth century before Christ. The earliest astronomical writing that has been preserved is a star catalog called the Almagest. It was prepared by Ptolemy, the Greek professor of astronomy at Alex-

andria, about 120-150 A. D. His catalog contains over a thousand stars divided into forty-eight constellations. This ancient grouping has never been disturbed seriously. Astronomical maps of the present day adopt the groups and use the names given by Ptolemy. The principal additions are those in the southern hemisphere, which were not known to the Greek writer. The entire sky has now been plotted off and given names. In all, the additions have brought up the number of constellations to eighty-nine. Most of Ptolemy's names were derived from Greek mythology.

Constitution, the fundamental law of a country. In American usage, the body of laws that define and limit the powers of government. It is a principle of modern constitutional law that whatever power or authority is not granted expressly to the government by constitution is retained by the people. The older, we may say, for example, the Russian, theory is that all authority or privilege not granted to the people is retained by the sovereign. Sometimes a constitution, as that of Canada or the United States, is written; sometimes it has grown up, largely by general understanding, as in England. It is very important that a country should have a constitution. Until very recently Russia was the most prominent example of a country without a constitution. The laws of that country were such as the emperor, acting under the advice of his intimate friends, might wish to make. They could be changed or suspended at his will. If he or his officers ordered cannon to be discharged into the peasants on the streets of St. Petersburg, there was no law of the land to bring the offenders to account. If the czar was satisfied, no one could interfere by law; while if a nihilist threw a bomb under the carriage of a prince, and blew him into eternity, the czar had full authority to order the wretch executed, with or without trial, and from his decision there was no appeal. Without a constitution, the crimes of a ruler cannot be punished legally by the people. Absolute rulers have it in their power, not only to punish, but to determine whether the acts of the people are legal or illegal.

The Constitution of the United States was drawn up by a convention of fifty-five members, representing twelve of the thirteen states. It met in the city of Philadelphia, and was presided over by George Washington. The convention was called to meet May 14, 1787, but a quorum was not secured until May 25th. Its work was completed September 17th. The legislature of Delaware was the first to ratify the Constitution. The adoption by New Hampshire, in June, 1788, made the Constitution operative.

By the Constitution of the United States the government is divided into three departments, the legislative, executive and judicial. The legislative department, or Congress, consists of two houses, the Senate consisting of two senators from each state chosen by the legislature of that state for a term of six years, and the House of Representatives chosen by the electors of those states for a term of two years, the number from each state being proportioned to the population. Congress has the power to make laws, levy taxes, declare war, and exercise other powers not forbidden to it by the Constitution.

The executive power is vested in a president chosen for four years by an indirect system known as the electoral college. The vice-president is chosen in the same way, but has no power in the government except in case of the death or disability of the president. The president is commander-in-chief of the military forces of the nation, administers the laws, and appoints diplomatic officers, supreme court judges and other officers, by and with the consent of the Senate.

The judicial power is vested in a Supreme Court, and in such other inferior courts as Congress may establish. The Supreme Court has jurisdiction over all legal cases arising under the Constitution; over cases in which the United States is a party; and over cases between the states.

The states ratified the Constitution on the dates given below:

1.	Delaware	Dec. 7, 1787
2.	Pennsylvania	Dec. 12, 1787
3.	New Jersey	Dec. 18, 1787
4.	Georgia	Jan. 2, 1788

5.	Connecticut	Jan. 9, 1788
6.	Massachusetts	Feb. 7, 1788
7.	Maryland	April 28, 1788
8.	South Carolina	May 28, 1788
9.	New Hampshire	June 21, 1788
10.	Virginia	June 26, 1788
11.	New York	July 26, 1788
12.	North Carolina	Nov. 21, 1789
13.	Rhode Island	May 29, 1790

The first president elected under the Constitution assumed office at the city of New York, on the 30th day of April, 1789. This Constitution consisted of fifteen articles. The first ten amendments went into force September 17, 1791. The eleventh became effective in 1798; the twelfth in 1804; the thirteenth in 1865; the fourteenth in 1868; the fifteenth in 1870; the sixteenth and seventeenth in 1913; eighteenth and nineteenth in 1920.

Much has been said as to the sources of the Constitution. Fanciful comparisons have been drawn with the institutions of Greece, Venice, Rome and Switzerland. No less a speaker than Gladstone has assumed that the Constitutional Convention did original work, and drew up a new constitution without a definite model in mind. The plain facts are that the leaders of the Revolution did the most natural thing in the world. They followed the unwritten constitution of England, to which they had been accustomed, and the constitutions of the several states which had grown out of two centuries of colonial self-government.

Consul, a commercial agent of a government. The consular service of the United States began in 1780. The present consular force includes consuls general, consuls, vice-consuls, clerks, interpreters, and other subordinates. It consists of over a thousand persons. They are appointed by the president, with the advice and consent of the Senate. The consular service is in charge of the secretary of state. The salary of a consul general, that is to say, the consul in a metropolis, is $12,000 a year, from which the salary ranges to $3,000. The salary of consuls varies from $2,000 to $8,000 a year. Those holding the lower salaried positions are permitted to engage in business for themselves. In 1922 the consular service of the United States included 7 consular inspectors, 27 consuls-general and 243 consuls. The consular force represents the United States in every important city in the world. About one-twelfth of the expense is paid by collected fees. In 1880 the United States government commenced the publication of a periodical called *Consular Reports,* giving information sent in from the various consular fields. It is designed primarily for the benefit of merchants; but is sent free to those who seem likely to make good use of it. It contains a great deal of interesting information. School libraries should have it.

The duties of a consul are of a varied nature. He is supposed to look after the welfare of American seamen, and to settle disputes between captains and their crews. He inspects the passports of American travelers, and assures the foreign government that they are genuine. He looks after the property of Americans who die abroad. He certifies that ships sailing for this country are in a sanitary condition, and that they carry nothing infected with plague. Much of the merchandise bought abroad must pay customs duty on reaching this country, according to its value. The consul examines the bills of lading at the ports where the goods are bought and certifies that the prices named are those, in his judgment, actually paid; thus protecting the United States from imposition through false bills. He upholds the dignity of the United States. He is secure from arrest, and may display the national flag over his door. Theoretically, his office is American soil. Americans abroad may be married in his presence and receive a certificate from him to the effect that the ceremony was performed within the jurisdiction of the United States. The usefulness of a consul depends entirely on his character and ability. Sometimes he is in position to do more for the American flag than falls to the lot of the ordinary minister or plenipotentiary.

In China and Siam, the consul sits with the local judge in trying cases to which Americans are a party. In Persia and other countries, Americans are subject to the jurisdiction of the United States consul, instead of to the local courts. These matters are, of course, arranged by treaty. We

accord the same privileges to consuls of other governments that they accord to ours.

See AMBASSADOR.

Consular Service. See CONSUL.

Consumption, a wasting away of the lungs, due to the attacks of bacteria. The term is exchangeable with tuberculosis. A more modern term is the white plague. Children of consumptive parents are not born with the germs of consumption in their lungs, but they may inherit weak lungs. If, for any one of a number of reasons, the lungs are weakened and the bacterium of consumption, or tuberculosis bacillus, is taken into the system, the disease is likely to become seated. Its progress is denoted by coughing, raising, and spitting, hectic fever, weakness, and emaciation. A damp climate is favorable to the growth of the disease. Want of cleanliness, bad ventilation, match making, coal mining, glass blowing, weariness, long hours, bending over at work; in short, any condition, occupation, or attitude that lacerates, cramps, or weakens the lungs renders one liable to attacks of the bacillus. While a perfectly healthy person is not subject to consumption, it is equally true that one in condition to take the disease cannot do so unless the bacteria from a consumptive person are taken into the system. Patients cannot be too careful, therefore, in the matter of expectoration. It is estimated that a patient may cast off 2,500,000 germs in a day. In case a consumptive spit on the sidewalk, or on the floor of a street car, depositing germs, it is likely that in a few hours they may have dried up and be floating about in the air, ready to be drawn into the lungs of some person in physical condition to become infected. The mischief is done. Tuberculosis is frequently acquired,—taken into the blood,—through the milk of infected cows. If conditions are favorable the germs soon settle in the lungs. About 120,000, or possibly 160,000 deaths occur annually in the United States from consumption. One authority hazards the statement that this disease is the cause of one out of every six deaths the world over. The period between the ages of fifteen and thirty seems to be the time of greatest danger. See DISEASE; BACTERIUM; KOCH.

Consumption, in political economy, is defined as the use of goods in the satisfaction of human wants; and by economists, is broadly divided into "constructive" and "final" consumption. The use of fuel to produce steam as power for machines making, say, shoes, is an example of constructive consumption; while the wearing out of the shoes is an example of final consumption. The phrase "human wants" is very essential to the definition of consumption in the economic sense, for when any product is destroyed, as by fire or flood, no human want is satisfied, and for the term "consumption" it is necessary to substitute "destruction." There is an obvious distinction between wise and unwise, or useful and harmful consumption. Generally, the unnecessary consumption of any kind of goods is unwise or harmful consumption.

Contempt, the legal designation of a passive or active diregard of or disobedience to constituted authority—as a legislative assembly or a court. Contempt usually consists in failure to obey the demands of such a body, or in insults offered it, and may be committed in the presence of the court, or outside the court by refusal to comply with its demands. The penalty for this offense consists, usually, of a fine, or of a fine and imprisonment.

Continental System, a plan formulated by Napoleon in 1806-07, to destroy England's commerce. Napoleon's attempt to injure England by way of India had failed in the Egyptian campaign; the attempted invasion from Boulogne had resulted in the destruction of the French Navy at Trafalgar, 1805; the only effective means left was to destroy England's commerce. After Napoleon defeated Prussia at Jena and entered Berlin in 1806, he issued his famous Berlin Decree by which he declared all British ports in a state of blockade, and all Britons found in France or its dependencies, prisoners of war. Great Britain immediately retaliated by an order prohibiting neutral vessels entering the ports of France or of any country allied with or dependent upon France. Napoleon then issued the Milan Decree whereby all vessels sailing from or to British ports, colonies, or dependencies were declared prizes of war.

American shipping, then in a flourishing state, was practically ruined, and England's policy in connection with the system gave offense to the United States and was one of the chief causes leading up to the War of 1812. Economically and politically the scheme was a failure, and it was abolished with the fall of Napoleon.

Continuation Schools. See SCHOOLS.

Contraband, articles in which international law forbids traffic during a time of war. A neutral nation is forbidden for instance, to sell either party to a war guns, ammunition, soldiers' clothing, or the like. If a merchant undertakes to supply these articles he does so at his own risk. The flag of his country does not protect him. A British or an American ship, endeavoring to carry contraband goods to the Japanese or to the Russians during the late war between these peoples, did so at the risk of the owner. Quite a number of ships were captured and confiscated. During the Civil War the Union troops were puzzled to know what disposition to make of slaves who came into their lines. The war was ostensibly for the preservation of the Union—not to free slaves. General B. F. Butler refused to return the slaves to their Southern masters on the ground that they were "contraband of war."

Conference on Limitation of Armament. Pursuant to the invitation of the United States, this conference met at Washington, November 12, 1921. The delegates were welcomed by President Harding, and the opening address was given by Charles Evans Hughes, Secretary of State.

Secretary Hughes' address was the keynote of the Conference. He startled the delegates and the world by his forceful presentation of the following plan for limiting naval armament:

1. That all capital shipbuilding programs either actual or projected should be abandoned.
2. That further reduction should be made through the scrapping of certain of the older ships.
3. That in general, regard should be had to the existing naval strength of the powers concerned.
4. That the capital ship tonnage should be used as the measurement of strength for navies, and a proportionate allowance of auxiliary combatant craft prescribed.

Following the address, Secretary Hughes was made Chairman, and announced that the work of the convention would be carried on under two committees of the whole: The committee on Naval Armament, consisting of delegates of the United States, Great Britain, France, Japan and Italy; and the committee on affairs pertaining to the Far East, which would include the delegates of all nations represented. The sessions of these committees were not open to the public.

The deliberations of the Conference resulted in the formation of the Four-Power Treaty, the Five-Power Naval Treaty, and five treaties relating to China and the Far East.

THE FOUR-POWER TREATY

The treaty was subject to the making of a convention with Japan concerning the status of the island of Yap. This convention, signed a few days later, recognizes the United States in join ownership of the island, and extends to the United States the same rights as the mandate confers on other allies and some additional stipulated privileges. This treaty internationalizes the island.

The treaties were presented to the Senate by President Harding on February 10. Since the Four-Power Treaty dealing with the relations of Great Britain, Japan, France, and the United States in the Pacific, was considered to lay the foundation for all the others, it was given first consideration.

After a protracted and somewhat acrimonious debate, during which opponents of the treaty brought all conceivable objections against it, the treaty was ratified March 24, 1922, by a vote of 67 to 27. Of the numerous reservations offered, only one was adopted:

The United States understands that under the statement in the preamble or under the terms of the treaty, there is no commitment to armed force, no alliance, no obligations to join in any defense.

The provisions of the treaty are included in the following articles:

1. The high contracting parties agree as between themselves to respect their rights in relation to their insular possessions and insular dominions in the regions of the Pacific Ocean.

If there should develop between any of the high contracting parties a controversy arising out of any Pacific question and involving their said rights which is not satisfactorily settled by diplomacy and is likely to affect the harmonious accord now happily subsisting between them, they shall invite the high contracting parties to a joint conference to which the whole subject will be referred for consideration and adjustment.

2. If the said rights are threatened by the aggressive action of any other power, the high contracting parties shall communicate with one another fully and frankly in order to arrive at an understanding as to the most efficient measures to be taken, jointly and separately, to meet the exigencies of the particular situation.

3. This agrement shall remain in force for ten years from the time it shall take effect, and after the expiration of said period it shall continue to be in force subject to the right of any of the high contracting parties to terminate it upon twelve months' notice.

4. This agreement shall be ratified as soon as possible in accordance with constitutional methods of the high contracting parties and shall take effect on the deposit of ratifications, which shall take place at Washington, and thereupon the agreement between Great Britain and Japan, which was concluded on July 13, 1911, shall terminate.

The American representatives signed with the following reservations:

1. That the treaty shall apply to the mandated islands in the Pacific Ocean; provided, however, that the making of the treaty shall not be deemed to be an assent on the part of the United States of America to the mandates and shall not preclude agreements between the United States of America and the mandatory Powers, respectively, in relation to the mandated islands.

2. That the controversies to which the second paragraph of article 1 refers shall not be taken to embrace questions which, according to principles of international law, lie exclusively within the domestic jurisdiction of the respective Powers.

The United States understands that under the statement in the preamble or under the terms of this treaty, there is no commitment to armed force, no alliance, no obligation to join in any defense.

Five-Power Naval Treaty

The Naval Treaty was adopted after the fifth plenary session held Feb. 1, 1922. It had been drafted by the committee on the limitation of naval armament, and embodied in modified form the recommendations made by Secretary Hughes.

Because of the details necessary to the scrapping of the ships, the treaty is too long for insertion in these pages. It includes, however, the following provisions:

1. The number and tonnage of ships to be retained, as laid down in the treaty for each of the five powers concerned, are included in the following table:

Country	No. ships	Tonnage
United States	18	525,850
Great Britain	22	558,950
Japan	10	301,320
France	10	221,170
Italy	10	182,800

All of the capital ships, built or building, of the United States, the British Empire, and Japan are to be disposed of according to directions in the treaty. The United States is allowed to complete and retain two ships of the West Virginia class now under construction. The British Empire may construct two new capital ships, not exceeding 35,000 tons each. Upon completion of these two ships the *Thunder, King George V, Ajax*, and *Centurion* are to be disposed of as directed in the treaty.

2. The contracting powers agree to abandon their respective capital shipbuilding programs, and no new capital ships shall be constructed or acquired except replacement tonnage which may be constructed or acquired as described in the treaty.

3. The total capital ship replacement tonnage of each of the contracting powers shall not exceed in standard displacement, for the United States, 525,000 tons; for the British Empire, 525,000 tons; for France, 175,000 tons; for Japan, 315,000 tons. The treaty further specifies that no capital ship exceding 35,000 tons standard displacement shall be acquired by, or constructed by, for, or within the jurisdiction of, any of the contracting powers.

No capital ship of any of the contracting powers shall carry a gun with a calibre in excess of 16 inches.

4. No aircraft carrier exceeding 27,000 tons standard displacement shall be acquired by, or constructed by, for, or within the jurisdiction of, any of the contracting powers.

However, any of the contracting powers may, provided that its total tonnage allowance of aircraft carriers is not thereby ex-

ceeded, build not more than two aircraft carriers, each of a tonnage of not more than 33,000 tons standard displacement, and in order to effect economy any of the contracting powers may use for this purpose any two of their ships, whether constructed or in course of construction, which would otherwise be scrapped under the provisions of the treaty.

The calibre of guns on aircraft carriers shall not exceed 6 inches, except anti-aircraft guns and the number of guns carried not exceeding 5 inches, shall not exceed ten.

5. No vessel of war exceeding 10,000 tons standard displacement, other than a capital ship or aircraft carrier, shall be acquired by, or constructed by, for, or within the jurisdiction of, any of the contracting powers. No vessel of war hereafter laid down, other than a capital ship, shall carry a gun with a calibre in excess of 8 inches.

6. Remaining articles referring to limitation of armaments forbid the preparation of merchant ships in times of peace, for the installation of warlike armaments; they require any of the contracting powers which shall contract to construct any vessel of war for nations not bound by the treaty, to inform each of the other contracting powers of the date of such contract. They also forbid any nation, not a party to this treaty, which engages in war, to use any vessel of war which may be under construction within its jurisdiction for any other power.

7. The concluding article of Chapter I of the treaty includes the following directions concerning fortifications and naval bases:

The status quo shall be maintained in: 1. The insular possessions which the United States now holds or may hereafter acquire in the Pacific Ocean, except (a) those adjacent to the coast of the United States, Alaska and the Panama Canal Zone, not including the Aleutian Islands, and (b) the Hawaiian Islands;

2. Hongkong and the insular possessions which the British Empire now holds or may hereafter acquire in the Pacific Ocean, east of the meridian of 110 degrees east longitude, except (a) those adjacent to the coast of Canada, (b) the Commonwealth of Australia and its territories, and (c) New Zealand;

3. The following insular territories and possessions of Japan in the Pacific Ocean, to-wit: The Kurile Islands, the Bonin Islands, Amami-Oshima, the Loochoo Islands, Formosa and the Pescadores, and any insular territories or possessions in the Pacific Ocean which Japan may hereafter acquire.

The maintenance of the status quo under the foregoing provisions implies that no new fortifications or naval bases shall be established in the territories and possessions specified; that no measures shall be taken to increase the existing naval facilities for the repair and maintenance of naval forces, and that no increase shall be made in the coast defenses of the territories and possessions specified. This restriction, however, does not preclude such repair and replacement of worn out weapons and equipment as is customary in naval and military establishments in time of peace.

The remaining portions of the treaty deal with specifications for scrapping certain ships, and for replacing.

The treaty is to continue in effect for ten years with the provision that at the end of eight years a conference may be called for the consideration of its termination or renewal.

Submarines and Gases

The question of limitation of naval armaments led to a prolonged discussion on the use of the submarine. France demanded the privilege of unrestricted building of submarines. Great Britain was for abolishing submarines, although the other nations considered the use of submarines as a means of defense legitimate. The variety of opinions led to the longest and most hotly contested debate during the conference.

The discussion did not result in restricting the construction of this type of warship, but it did lead to a Five-Power

treaty prohibiting the unrestricted use of the submarine, and abolishing completely the use of poisonous gases. This treaty was based upon the following resolutions which had been prepared by Mr. Elihu Root:

1. The signatory powers, desiring to make more effective the rules adopted by civilized nations for the protection of the lives of neutrals and noncombatants at sea in time of war, declare that among those rules the following are to be deemed an established part of international law:

(a) A merchant vessel must be ordered to submit to visit and search to determine its character before it can be seized.

A merchant vessel must not be attacked unless it refuses to submit to visit and search after warning or to proceed as directed after seizure.

A merchant vessel must not be destroyed unless the crew and passengers have been first placed in safety.

(b) Belligerent submarines are not under any circumstances exempt from the universal rules above stated, and if a submarine cannot capture a merchant vessel in conformity with these rules, the existing law of nations requires it to desist from attack and from seizure and to permit the merchant vessel to proceed unmolested.

2. The signatory powers invite all other civilized powers to express their assent to the foregoing statement of established law so that there may be a clear public understanding throughout the world of the standards of conduct by which the public opinion of the world is to pass judgment upon future belligerents.

3. The signatory powers recognize the practical impossibility of using submarines as commerce destroyers without violating, as they were violated in the recent war of 1914-18, the requirements, universally accepted by civilized nations for the protection of the lives of neutrals and noncombatants, and to the end that the prohibition of the use of submarines as commerce destroyers shall be universally accepted as a part of the law of nations they now accept that prohibition as henceforth binding as between themselves and they invite all other nations to adhere thereto.

4. The signatory powers, desiring to insure the enforcement of the humane rules of existing law declared by them with respect to attacks upon and the seizure and destruction of merchant ships, further declare that any person in the service of any power who shall violate any of these rules, whether or not such person is under orders of a governmental superior, shall be deemed to have violated the laws of war and shall be liable to trial and punishment as if for an act of piracy and may be brought to trial before the civil or military authorities of any power within the jurisdiction of which he may be found.

Treaties Relating to China

At the meeting of the disarmament committee, on November 16, China presented her proposals which had been drawn up by Mr. Sze. These called for a complete removal of all political, jurisdictional and administrative restrictions on the Chinese Republic. The United States, Great Britain and Japan all had indicated their willingness to start the debate on the bases presented by Mr. Sze.

While some of the proposals met with ready acceptance, others led to a complicated discussion, and the differences were finally settled by the adoption of the following resolutions which were introduced by Elihu Root on behalf of the American delegation:

It is the firm intention of the powers attending this conference hereinafter mentioned, to wit, the United States of America, Belgium, the British Empire, France, Italy, Japan, the Netherlands, and Portugal:

1. To respect the sovereignty, the independence and the territorial and administrative integrity of China.

2. To provide the fullest and most unembarrassed opportunity to China to develop and maintain for herself an effective and stable government.

3. To use their influence for the purpose of effectually establishing and maintaining the principle of equal opportunity for the commerce and industry of all nations throughout the territory of China.

4. To refrain from taking advantage of the present conditions in order to seek special rights or privileges which would abridge the rights of the subjects or citizens of friendly States and from countenancing action inimical to the security of such States.

A treaty, allowing China 5 per cent ad valorem duty, was accepted by the nine powers, with the expectation that the revenue thus afforded would enable China to regain her former financial standing.

Shantung Treaty. Settlement of the Shantung controversy between China and Japan was one of the most difficult problems presented at the conference, and it required three months of the most patient and painstaking conferences between the delegations of these two countries.

The agreement was finally reached through the kindly assistance of Secretary Hughes and Mr. Balfour, to whom both delegations acknowledged their gratitude.

The greatest point of contention was the Shantung Railway, which the Japanese had taken over. They were naturally unwilling to relinquish the management of the railroad to the Chinese, considering the large expenditure which they had made upon it. It was finally agreed that China should purchase the railroad on a financial basis which will extend the payment over a term of years.

The Japanese agreed to withdraw their troops from the peninsula, and relinquish control of the territory. This treaty was adopted at the last plenary session, February 6, 1922.

The beneficial effects of the Conference in the Far East were soon manifest. Peace was established between China and Japan; the friction between Japan and the United States and some other nations was removed. Japan began the evacuation of Siberia, September 4, 1922, with the understanding that her troops were to remain in the northern part of Sakhalin over which there was a dispute with Russia. The United States, Britain and Japan ratified the treaties at early dates. Italy followed but France delayed and had not acted in May, 1923.

The United States, Britain and Japan began scrapping their ships in compliance with the terms of the treaty dealing with disarmament, and the threatening situation in the Pacific was removed.

Convict. See PRISON.

Convict Labor, the employing of prisoners in productive work whereby they are kept from idleness and earn the cost of their living. There are three plans followed in the United States, the lease system, the contract system, and the public account system. The lease system gives the convicts over to contractors, who are thereafter responsible for their care and detention. There are two forms of this system. In the one the state furnishes the material and tools and the work is supervised by the contractor; in the other, the piece-price system, this arrangement is reversed and the product is bought at a fixed price by the contractor. The public account system, which is growing in favor, has all material, tools, etc., provided by the state; supervision is by state officials, and the profits go into the state treasury. The lease system has little in its favor except that it often nets considerable sums to the state, for prisoners are often inhumanly treated, frequently escape, and come under the influence of no system of reform. It is used only in a few of the southern states. The contract system is economical but sometimes interferes with prison discipline, particularly when an outside overseer is in charge. The public accounts system avoids this difficulty, though it often places the warden in a difficult position—he is tempted to strive rather for financial success than for the reformation of his prisoners. The whole system of convict labor has met with opposition from both employers and labor unions.

Conway Cabal', a conspiracy formed in 1777 among officers of the American colonial army for the purpose of depriving Washington of command. The leading spirit was Thomas Conway from whom the intrigue takes its name. Gates had won a signal victory at Saratoga. By comparison Washington seemed far too inactive in the eyes of Conway and his friends and they planned to promote Gates to supreme command. The plot was discovered and broken up.

Cook, James (1728-1779), an English navigator. He was born in an inland part of Yorkshire, but went to sea when a boy. He entered the royal navy in 1755. Four years later he commanded a ship in the squadron sent to the Gulf of St. Lawrence, and distinguished himself in the operations against Quebec. His seamanlike qualities and his diligence so commended him that he was given the command of three important scientific expeditions.

In 1768 his ship conveyed a scientific party sent out to the Pacific Ocean to observe the transit of Venus, June 3, 1769. Cook and his party took advantage of the opportunity to visit New Zealand and explore the eastern coast of Australia. This is the basis of the large territorial possessions of England in that quarter. Interest in the Antarctic region having been aroused by the published accounts of the voyage, Captain Cook was sent with two

ships and a second party to coast the great ice barrier described in the article under ANTARCTIC CONTINENT. His investigations of ship's scurvy, the great pest of long sea voyages, and the use of vegetables as an antidote for salt diet, procured his admission to the Royal Scientific Society of which his fellow travelers, scientific men, were members.

Captain Cook's third voyage was made for the purpose of ascertaining whether a passage existed between the Pacific and Atlantic oceans by way of the Arctic regions. He set out in 1776, the year of American independence, showing that, in the British mind, the American war was but an incident, not an engrossing struggle. He commanded his old ship, the Resolution, and a second ship, the Discovery. On his way he discovered the Sandwich Islands, and explored the western coast of North America, then unknown, as far as Kamchatka. The winter of 1778 was passed at Hawaii. When on the point of leaving, February 14, 1779, Captain Cook went ashore and attempted to seize the person of the king to hold him as a hostage for the return of a stolen boat. The natives, ordinarily inoffensive, became exasperated, and attacked the small party of Englishmen, killing the distinguished navigator before he could regain the protection of his boats. Cook's journal, supplemented by the accounts of his scientific associates, are among the most entertaining annals of discovery and scientific investigation. They are excellent reading. The expeditions he led reflect credit on the British name. The name of Cook is of frequent occurrence in any atlas of the Pacific and Antarctic regions.

See HAWAII.

Cooke, Jay (1821-1905), an American financier. He was a native of Sandusky, Ohio. In 1858 he founded the banking house of Jay Cooke and Company, of Philadelphia. When the Civil War broke out, and Lincoln called for troops and money, Cooke went about among his friends and raised $2,000,000 for immediate use. He was to the Civil War what Robert Morris was to the Revolution. He was entrusted with placing the immense loans needed by the government, and succeeded in raising the amount of $2,000,000,000, a feat unequaled in the history of finance. His charges for the work were moderate. At the close of the war his firm undertook to furnish the means to build the Northern Pacific railroad. Jay Cooke was president of the road. His firm failed in the hard times of 1873, precipitating a panic. Cooke afterward made himself comfortable by wise investments in Western land, but he made no effort to reëstablish himself as a leader in finance. His reputation is that of a genial, upright, patriotic man—one whom his neighbors liked to see prosper.

Cooke, Rose Terry (1827-1892), an American poet and novelist. She was born in Connecticut. Her first volume of poems was published in 1860. She was one of the contributors to the *Atlantic Monthly* in the early days of that magazine. Her stories treat of New England life. *Happy Dodd, Steadfast,* and *Huckleberries,* may be mentioned among her prose writings. *The Two Villages* is the best known of her many poems.

Cookery. See DOMESTIC SCIENCE.

Coolidge, Susan, a pseudonym of Miss Sarah Chauncey Woolsey. See WOOLSEY, SARAH CHAUNCEY.

Coon. See RACCOON.

Cooper, one engaged in the business of making barrels, kegs, firkins, casks, butts, or hogsheads. The upright pieces forming the sides of cooperage are called staves. The swelling or bulge at the middle is formed by making each stave a little wider in the middle than at the ends. A skillful cooper shaves his staves, cuts out his heads, and makes the hoops all so exact that when he sets up the staves, puts in the heads, and drives on the hoops, the different parts are a perfect fit without the removal of a shaving. The tapering of the barrel enables the hoops to be driven on tight. The surface, being curved on the principle of an arch, is very much stronger than the same amount of material in the shape of a box. If the staves shrink a little they can be tightened by driving up the hoops. Although the barrel is not a convenient receptacle for storage in a car or ship, no substitute has been found. Wine casks and beer kegs are made of great

thickness to withstand the pressure of the fermenting liquid. Casks for vinegar, oil, and syrup require to be strong. Oak is the favorite material for all such cooperage. Nowadays cooper shops employ a great deal of machinery. In the making of flour barrels the only work done by hand is the handling of material and the setting up of the barrels. One of the sights of industrial Minneapolis is the continuous succession of flour barrels coming down a shute from the cooper's shop into the large racks in which they are drawn by two-horse teams to the mills. The driver does not think he has a load until his rack contains 175 barrels. The last United States census reports 2,146 cooper shops, with 22,938 wage earners, and an annual output valued at over $40,000,000. In 1908 a careful writer stated that the American demand for tight cooperage, chiefly from the distilleries, required the yearly manufacture of 267,827,000 staves and 17,774,375 headings, valued at over $12,000,000.

Cooper, James Fenimore (September 15, 1789 - September 14, 1851), the author of the *Leatherstocking Tales*. The Coopers were a Quaker family from Stratford-on-Avon, Shakespeare's birthplace. Father Cooper was a New Jersey judge. He was a man of culture, wealth, and energy. He sat in Congress and was a leading Federalist. Mrs. Cooper was of Swedish descent. James Fenimore was born at Burlington, New Jersey, the youngest but one of twelve children. When he was a year old the family moved to what was then the western frontier of New York, and founded the village of Cooperstown on Otsego Lake. Here they lived for six years in a log house. Judge Cooper secured a large tract of land, and in time built what was known as the "Hall." The old home is described in *The Pioneers* as Templeton. James came into contact with the Indians, and saw much of primeval life in the forests and on the rivers and lakes of that beautiful region. He was fitted for college at Albany, and was sent to Yale at the age of thirteen. Ere graduation day he was dismissed in disgrace for engaging in college pranks. He then went to sea, and served as a midshipman and lieutenant. In 1811 he married a Miss De Lancey, sister of the Bishop of Western New York. Her family were Tories. Young Cooper left the navy, thus taking no part in the War of 1812. For ten years he followed the profession of a gentleman farmer.

Through reading English novels he became fired with the ambition to write. His first production was *Precaution,* an English society novel. It was received with some favor in England, but not at home. In 1821 he published *The Spy: A Tale of the Neutral Ground*. Inasmuch as no publisher was willing to risk an American novel, Cooper published it at his own expense. *The Spy* made Cooper famous on both sides of the Atlantic. It was translated into all the modern languages of Europe, and even into Arabic, Russian, and Persian. For ten years he wrote rapidly. From 1826 to 1833 he resided abroad at Paris, Berne, Florence, Naples, and Rome. Among his acquaintances were Sir Walter Scott and the Marquis Lafayette. Returning to New York he got into legal controversy with his neighbors relative to the use of picnic grounds which his father had granted to the public on certain conditions not complied with. Cooper's life was embittered by local feuds. At death he enjoined his family to furnish no material for a biography.

Cooper rests in the churchyard of Christ Church by the side of his wife. A monument in Lakeside Cemetery near by was erected in his honor. It consists of a column surmounted by a figure of Leatherstocking. Cooperstown is now given quite over to his memory. The steamers on Otsego Lake are named for characters in the *Leatherstocking Tales*. Otsego Rock is noted as the traditional meeting place of Indians. Leatherstocking Falls and Leatherstocking Cave are pointed out to tourists as places of literary interest.

Cooper's experience in the navy furnished him the material for *The Red Rover* and other sea tales. His fame rests, however, on *The Spy* and the *Leatherstocking Tales*. The latter should be read in the following order: *The Deerslayer, The Last of the Mohicans, The Pathfinder, The Pioneers,* and *The Prairie*. Mark Twain

and other critics have been pleased to make merry over absurdities, contradictory statements, and marvelous extrications from impossible situations. Indeed, there is abundant opportunity for such remarks, but Cooper is none the less first of American storytellers. He wrote at the same time Walter Scott was writing, and almost as rapidly. The *Leatherstocking Tales* are in their way as original, as distinct, and as great an achievement as the *Waverley Novels*. As characters of the rifle, the forest, and the canoe, Hawkeye and Uncas are not surpassed.

There was a brilliant story-teller in Cooper, but there was also a prosy moralist and reformer; and when circumstances called the latter to the front, it went hard with the story-teller.—Bronson.

To the French and the Germans, to the Italians and the Spaniards, James Fenimore Cooper is as well known as Walter Scott. Irving was the first American writer of short stories, but Cooper was the first American novelist; and, to the present day, he is the one American novelist whose fame is solidly established among foreigners.—Brander Matthews.

Probably the best service a friend can do a friend is to point out his faults to him; and there is nothing for which America owes more gratitude to Cooper than for his faithfulness in this respect.—Noble.

It must not be forgotten that the literary world is Cooper's debtor for a new sensation. Leatherstocking and Long Tom Coffin are his invention. They may seem artificial now, but they were vivid characters once, and the most superior of us read their stories with breathless interest.—Shaw.

He has drawn you one character, though, that is new,
One wild flower he's plucked that is wet with the dew
Of this fresh Western world, and, the thing not to mince,
He has done naught but copy it ill ever since.
—Lowell.

Cooper, Peter (1791-1883), an American inventor, manufacturer, capitalist, and philanthropist. He was a native of New York. He had a very meager common school education. His father was a hatmaker, and he himself learned the trade of coachmaking. Among his inventions were a cloth-shearing machine and various mechanical devices. He manufactured glue for many years. He constructed the first locomotive engine built in America. He took interest in the Erie canal, in the first Atlantic cable, and was the first to roll wrought iron beams for fireproof structures. In 1876 he received 100,000 votes as the presidential candidate of the Independent party. He will be remembered as the founder of Cooper Union, which see.

Cooper Union, or **Cooper Institute,** an industrial or technical school founded in New York City by Peter Cooper in 1854. Cooper gave nearly a million dollars for site, buildings, and endowment. Other members of the family have made various gifts which have been supplemented by Abram Hewitt and others. Andrew Carnegie has given $600,000. Instruction is given in engineering, electricity, chemistry, physics, astronomy, mechanical drawing, architecture, free-hand drawing, clay modeling, painting, music, literature, engraving, and pottery. The institute has a museum, an art gallery, a library of 40,000 volumes, and a well appointed reading room. The enrollment of students is between three and four thousand. Degrees are conferred in engineering by the Cooper Institute.

Cooperation. Cooperative production and distribution of commodities has been practiced for a century or more in Europe, but it is only within the last twenty years that the American cooperative movement in its present form has gained large proportions.

Cooperative buying and selling in England led finally to cooperative production; and in that country, the Wholesale Cooperative organization has five clothing factories, eight flour mills, woolen cloth works, overall, shirt, cap, underwear, tobacco, leather goods, blanket and hardware factories, bookbinding and lithographic works, and many other industrial plants. It owns creameries in Ireland, bacon factories in Denmark, tea plantations in Ceylon and India, and its ships ply between England and France. It owns 10,000 acres of wheat land in Saskatchewan, and is, besides, the largest single buyer of Canadian wheat. In 1921, this English cooperative movement had 4,500,000 members.

The same kind of enterprises, on smaller scale, are to be found in Denmark, Germany, France, Holland, Poland, and in other European, Asiatic, and South American countries, and lately the movement is gaining numbers and influence in the United States.

The American grain growers and stock raisers knew the benefits of cooperative societies as long ago as the seventies in the last century, when the Granger Movement reached its greatest influence. And though that movement waned and finally died, the idea of cooperative production and distribution lived.

There are at present in the United States cooperative organizations of fruit growers, grain growers, cotton growers, tobacco growers, dairy products manufacturers, peanut growers, and others. The United States Grain Growers, Inc., is the second largest and the California Citrus Growers Association the largest of these American societies.

Minnesota was one of the most enterprising of the states in the days of the Granger Movement, and she led the United States in the number of cooperatives in 1921; Iowa is second, and Illinois third. While but little specific data has been gathered as to the actual buying and selling figures of the cooperatives in the United States, it is known that the members annually save hundreds of thousands of dollars that were wasted in former years through inefficient production, buying and selling.

In the following table are given the number of cooperatives in the United States in 1921:

State	Cooperatives 1921
Alabama	61
Arizona	15
Arkansas	139
California	258
Colorado	119
Connecticut	39
Delaware	15
Florida	77
Georgia	77
Idaho	90
Illinois	613
Indiana	221
Iowa	874
Kansas	567
Kentucky	77
Louisiana	57
Maine	110
Maryland	21
Massachusetts	56
Michigan	354
Minnesota	1,517
Mississippi	48
Missouri	230
Montana	188
Nebraska	603
Nevada	3
New Hampshire	14
New Jersey	20
New Mexico	19
New York	259
North Carolina	101
North Dakota	581
Ohio	280
Oklahoma	151
Oregon	99
Pennsylvania	124
Rhode Island	6
South Carolina	41
South Dakota	411
Tennessee	107
Texas	271
Utah	35
Vermont	60
Virginia	89
Washington	202
West Virginia	39
Wisconsin	775
Wyoming	31
Total	10,141

Cooperative Store, a store owned and managed in the interest of customers. What are known as cooperative stores had their origin in Rochdale, England. Twenty-eight weavers decided to make an experiment to better the wretched condition of working people. They laid aside two pence (four cents) a week each, until they had $140 in hand. They rented a ground floor room at the rate of $1 a week. After fitting it up they had $70 left to buy stock. They started with a little flour, a little butter, some sugar and a sack of oatmeal. They opened December 21, 1844. They sold only to members of their association. They charged $5 admission, payable at the rate of four cents a week. To each purchaser, with each purchase, a brass tag was issued, entitling the buyer to a share, according to the size of his purchase, in

whatever profits might be made. They kept open at first two nights a week; they bought for cash; they sold for cash. No clerk hire was paid. Those who managed the store charged nothing for their services. They bought pure goods; they sold at going prices. The attractive feature of the store was profitsharing. The plan took well with the mothers; for there was a general feeling that shopkepers lived at the expense of their customers. The store prospered, and in the following March tea and tobacco were added to the stock. At the end of the first year there were eighty members. The stock on hand was worth $905, and the weekly sales amounted to $150. The store was kept open five nights a week and Saturday afternoons. Working people in other states adopted the plan. From this beginning grew the cooperative movement of the western world.

Coot, an aquatic bird with the habits of a duck. It is popularly called a mudhen. The American coot is fifteen inches in length. It has bluish, slate-colored plumage, a black neck and head, and an ivory-white bill. In place of being webbed, the toes are fringed with greenish, curiously scalloped flaps. The coot does not take to wing freely, but patters along for a hundred feet or so, striking the surface of the water with the feet. It is a skillful diver, and, being worthless for food, it is bolder than the wild duck. The female lays from eight to fifteen buffy white eggs in a nest built of grasses in the reeds of a freshwater marsh. The range of the coot extends from Alaska and Greenland to the West Indies. The bird referred to in the lines from Tennyson's *Brook,* "I come from haunts of coot," etc., is the European cousin of this bird. See GREBE.

Copal, kō′pal, a hard, clear, amber-like resin derived from various tropical trees. It is found also in the ground in a semi-fossil state, deposited, no doubt, by decaying timber. The best quality is obtained from pod-bearing trees on the east coast of Africa, Zanzibar, and Mozambique. Dissolved in hot linseed oil or in spirits of turpentine, it makes a clear, transparent varnish of great beauty and durability. See AMBER; LAC.

Copenhagen, kō-pen-hā′gen, the capital city of Denmark. Latitude, 55° 40′ 52″ N.; longitude, 12° 35′ 46″ E. It is situated chiefly on the island of Zealand, here separated from an adjacent island by a passage that affords fine anchorage and a harbor for shipping. With its suburbs, the city had a population in 1921 of 666,-159, approximating that of Baltimore. The name is Scandinavian and signifies merchants' haven. The city was founded in the twelfth century on the site of a fishing village. From the first it has risen rapidly. It became the capital of King Christopher in 1443.

Naturally enough, the city was never a favorite with the Hanseatic League, by which it was attacked several times. It withstood a siege from the Swedes in 1700. In 1801 the English under Parker and Nelson destroyed the Danish fleet off Copenhagen harbor to prevent its falling into the hands of Napoleon. The chief exports at present are such as might be expected from the metropolis of a dairy country—butter, cheese, beef, cattle, wool, and hides—as well as grain. There are ten distilleries, and many manufactories of porcelain ware, pianos, clocks, safety matches, sugar, and snuff. The trade with Iceland and Greenland is centered here.

The city is a literary and art center. A national university, with museums, an immense library and a botanical garden, is here. Unlike many European universities it is open to students of both sexes. The public buildings of the city are not remarkable, but they are rich in art treasures. The royal picture gallery does not rank quite with that of Dresden and Florence, but it contains paintings by such masters as Van Dyck, Rubens, and Rembrandt. A Thorwaldsen museum, built after the somber fashion of an Etruscan tomb, shelters the burial place and original models of the statuary of that famous sculptor. The round tower of Trinity Church is 115 feet high. Instead of a stairway it is ascended by means of a broad spiral roadway, up which Frederick the Great is said to have driven a carriage drawn by four horses.

The Museum of Northern Antiquities, a large collection of weapons, tools, utensils,

hunting gear, coffins, burial urns, church vessels, inscriptions, ornaments, armor, tombstones, etc., 40,000 in number, the greatest and most valuable collection of ancient man in existence, is here. The relics are admirably arranged in order of time. The flint period is illustrated by flint implements, bones and shells from the famous kitchen middens, or refuse heaps of prehistoric Denmark. Relics of the bronze period indicate that the art of casting, learned from the south, was well developed. The peat moor and bogs have yielded many iron articles, including Roman coins, indicating intercourse with that people at an early date. The exhibit is very complete down to 1660. Other museums or departments exhibit the antiquities of the rude nations of Europe, Asia, and Africa, as well as of the navigators known in history as the Vikings.

The vicinity of the city is attractive. The blue water of the sea, level drives, fine old beech forests, wayside inns, pleasure gardens, beautiful grounds, deer parks, and handsome residences render the neighborhood delightful.

See DENMARK.

Copernicus, ko-per′nĭ-kŭs, **Nicholas** (1473-1543), a celebrated astronomer. A native of Thorn, Poland. Of German ancestry. He studied at Cracow, Bologna, and Padua. Copernicus was a professor of mathematics at Rome, 1501, and later he became canon of a cathedral under his bishop uncle, his mother's brother. Taking the hints given by Pythagoras, Copernicus spent several years in studying the apparent motions of the heavenly bodies, and wrote a treatise, first published at Nuremberg in 1543 giving proof that the earth and planets move around the sun as a center. In deference to the Church of Rome, from which he anticipated opposition, Copernicus dedicated his book to the pope and put forth his theory as a mild suggestion with such proofs as had occurred to him. The central statement of the work is this: "The earth is not the center of the universe. It is only a satellite of the sun." It is needless to say that the "Copernican System" was rejected promptly by the authorities of the day. It is said, on what authority we do not know, that Copernicus received the first copy of his book fresh from Nuremberg the day he died. A crater, 56 miles in width, of an extinct volcano in the moon has been named Copernicus in honor of the great astronomer.

See KEPLER; GALILEO.

Cophetua, ko-fĕt′u-ȧ, **King,** in old English ballad, an African king. He disdains all womankind, but Cupid appears. "He drew a dart and shot at him." Cophetua then falls in love with a beggar maid, named Penelophon. He weds her and they live a long and happy life together. Shakespeare alludes to Cophetua several times. In *Romeo and Juliet* occurs the line, "When King Cophetua loved the beggar maid." Tennyson in *The Beggar Maid* has given a pretty, modernized version of the story.

Her arms across her breast she laid;
  She was more fair than words can say:
Bare-footed came the beggar-maid
  Before the king Cophetua.

In robe and gown the king stept down,
  To meet and greet her on her way;
"It is no wonder," said the lords,
  "She is more beautiful than day."

As shines the moon in clouded skies,
  She in her poor attire was seen:
One praised her ankles, one her eyes,
  One her dark hair and lovesome mien.

So sweet a face, such angel grace,
  In all that land had never been:
Cophetua sware a royal oath:
  "This beggar maid shall be my queen!"

Copley, John Singleton (1737-1815), an American historical painter. He was born in Boston of Irish parentage and died in London, where he had resided for some years. Although called an American artist, his subjects, his associations, and his sympathies were British. At an early age, he showed talent for drawing. He was self educated. His first reputation in England was made by a picture called *The Boy and the Squirrel,* which he sent anonymously to Benjamin West, who exhibited it at the Society of Arts in 1860. It was praised highly by the best English artists. In 1783 Copley was elected a member of the Royal Academy. Some of Copley's most celebrated portraits are of the English Royal family. *The Death*

of Lord Chatham, now in the London National Gallery, is considered Copley's best work. His *Siege and Relief of Gibraltar* is kept in the council chamber of the Guildhall. Had he returned to his native land and employed his talents on Revolutionary subjects, he would have attained a more prominent place in the history of art. Holmes in *The Autocrat of the Breakfast Table* alludes to Copley portraits:

> The great merchant-uncle, by Copley, full length, sitting in his arm-chair, in a velvet cap and flowered robe, with a globe by him, to show the range of his commercial transactions, and letters with large red seals lying around, one directed conspicuously to The Honorable, etc., etc. Great-grandmother, by the same artist; brown satin, lace very fine, hands superlative, grand old lady, stiffish, but imposing.

The allusion is further explained in a footnote, as follows:

> The full-length pictures by Copley I was thinking of are such as may be seen in the Memorial Hall of Harvard University, but many are to be met with in different parts of New England, sometimes in the possession of the poor descendants of the rich gentlefolks in lace ruffles and glistening satins, grandees and grand dames of the ante-Revolutionary period.

Copper, a hard, reddish metal. Pure copper is one of the chemical elements. Symbol, Cu., atomic weight, 63.6; density, 8.9. Copper is one of the most useful metals. It is rolled or hammered into thin sheets, and may be drawn into slender wire of great strength. A copper rod one square inch in section is capable of sustaining a weight of 80,000 or even 90,000 pounds. Copper does not tarnish in dry air, but in moist air it becomes covered with a coating of green. Copper forms poisonous compounds. Vegetables of all sorts may be boiled safely in a copper kettle, but should on no account be allowed to stand in it. Vinegar should not come into contact with copper. The green rust which forms on the surface of copper kettles and on copper coins is a carbonate of copper. It is formed by the carbonic acid and oxygen of the air, which act upon moist copper. It is very poisonous; hence naked copper vessels would better not be used at all in cooking. Although copper is a poison, the human system seems to require a trace of it. Bread and nearly all ordinary foods contain from two to four parts of copper to the million. The tissue of the human liver contains thirty parts to the million. Copper is found usually in compound with other elements. In union with carbon it forms a beautiful mineral known as malachite; with sulphur and iron, it forms copper pyrites. It occurs also as an oxide, and in combination with sulphur. In these cases it occurs in fissures or veins in rocks. Masses of copper occur in conglomerate rocks and in sandstones. This is the case in the Superior region and to some extent in Montana.

Copper is distributed widely, but is found in paying quantities in few localities. The first American copper was found in Connecticut. Montana, the upper peninsula of Michigan, and the mines of Arizona furnish half the world's copper. The Michigan copper mines appear to have been visited by the American Indians in prehistoric times. Shallow pits were found by the white man from which the aborigines had apparently dug copper. Large blocks of pure copper had been detached and left by them. Copper ornaments, bracelets, rings, and anklets, implements, knives, awls, and axes, made, apparently, from Lake Superior copper, have been found in Indian graves and old dwellings. The most celebrated copper mine in this region is the Calumet and Hecla, which has already reached a depth of over 4,000 feet, and has yielded as high as 63,000,000 pounds of copper in a single year. The Anaconda mine of Butte has reached a depth of 1,000 feet. An entire granite mountain is seamed with copper and silver veins. It is the source of wealth on which the city has been built up. Montana has a reputation for having produced over 340,000,000 pounds of copper in a single year. Utah, California, Oregon, Colorado, and New Mexico have deposits of copper, and even Vermont produced 1,200,000 pounds of copper in 1892. About one-sixth of the world's copper is refined by a single plant in Brooklyn. Of old world mines the most famous are near Seville, where a series of copper veins crosses the

boundary line between Spain and Portugal. Russia, Norway, Sweden, and Austria produce copper. Italian veins were worked by the ancient Etruscans. The ancient supply of Great Britain was drawn chiefly from Cornwall. Copper is also produced in Mexico, Nova Scotia, the province of Quebec, Cape Colony, Chile and Australia. A rather remarkable mine is found in Japan. The world annually produced about 2,000,000,000 pounds of copper before the war. Afterward, in 1916, America alone was said to have exceeded that amount, while later the United States doubled its refining capacity and could produce 2,780,000,000 pounds per year in 1918.

Bronze of apparent Asiatic origin containing a little tin, was in use in Homeric times. Tools of copper in the form of bronze have been found in the lake dwellings of Switzerland. Although both copper and tin are soft, an alloy of these metals is hard. Cannon are made of an alloy of ninety parts of copper and ten of tin. Bronze statues are made usually of copper, tin, and zinc. There are over one hundred grades and kinds of bronze. Brass is also an alloy of copper with zinc, much used for builder's hardware and for ornamental purposes in machinery. Copper was once in great demand for sheathing the keels of vessels, but it has been supplanted largely by iron and by the substitution of copper paint. Copper is still used for plumbing and for roofing. Copper wire is strong and is an excellent conductor of electricity. An immense amount is used in the manufacture of telegraph and telephone wires. Copper oxide is used to color glass a ruby-red tint. The annual consumption of copper for all purposes has increased faster than that of any other metal, and it is now estimated that the United States alone uses 1,000,000,000 pounds per year.

The price of copper has been subject to extreme fluctuations. During the past fifty years it has ranged from nine cents to sixty cents per pound, but of late the few really considerable copper mines have passed into the hands of owners who cooperate under an agreement as to quantity and prices. For some years the price of copper has been from twelve and one-half cents to fifteen cents per pound.

The war industries board fixed the price of copper for the war at 23½ to 26 cents per pound.

The North American production of copper for 1919 as estimated by the United States Geographical Survey:

States	Pounds
Alaska	56,534,992
Arizona	536,515,368
California	23,548,698
Colorado	4,892,538
Idaho	3,966,655
Michigan	201,716,335
Montana	176,289,873
Nevada	64,683,734
New Mexico	60,377,320
Oregon	2,808,017
Tennessee	15,629,454
Utah	146,178,088
Other states	32,399,066
Total	1,310,541,529
Canada	77,775,600
Mexico	158,760,000

In 1917 copper exports aggregated 1,083,575,360 pounds, while in 1918 they ran at more than 2,000,000 pounds per day. At one time Chile was the greatest copper producer of the world but her mines were later neglected until the war demands brought large investments from America and the mines became active again. Great Britain gets most of her copper from the United States.

Copperas. See VITRIOL.

Copperhead, or **Cottonmouth,** a venomous reptile related to the rattlesnake and the moccasin. Its general color is coppery; top of head, coppery-red; belly, yellowish; length, up to forty inches. It is nowhere abundant. It ranges from New England to Wisconsin south and westward to Texas. The copperhead is an inhabitant of marshes and meadows, woods and rocks. It is not found in a prairie country. It lives on mice, frogs, and birds. During the Civil War, Northern men with Southern sympathies were called "copperheads" as a term of extreme opprobrium. See MOCCASIN SNAKE; RATTLESNAKE.

Copra. See COCOANUT.

Copts, native Egyptians. No doubt the Egyptians underwent more or less intermixture during the sway of the Roman Empire; and yet it may be said that the Copts are the descendants of the ruling class of ancient Egypt. The Copts have been overrun by the Arabs so long that their language is almost extinct. They have kept alive many customs however. Not infrequently a conquering people is absorbed by the conquered, as was the case in Greece and Italy and Spain; but the Copts have been losing to the Arabs ever since the Arabian conquest. At the middle of the nineteenth century they formed about one-fourteenth of the population of Egypt.

Many of the Copts are now Mohammedans; many others are Roman Catholics; but the majority are members of what is known as the Coptic church. Speaking strictly, the term is racial, but in ordinary use Copt refers to the church or denomination. The Abyssinians are also adherents of the Coptic church. The head of the Abyssinian church is consecrated by the Coptic patriarch of Alexandria and acknowledges no other authority. The Copts are reputed to have been converted to Christianity by St. Mark. As compared with Protestant denominations, the Coptic church is an ancient one, dating as a schism from the Orthodox Greek Church in 451, before the final rupture between the Greek and the Roman churches. In foundation doctrine the Copts differ little from the Church of Rome. The head is the patriarch of Alexandria, who refuses all allegiance to the sees of Rome and Constantinople. The church has regular orders of bishops, priests, and monks. All but the superior clergy are allowed to marry. These ancient Egyptians have been harassed by the Greeks, the Romans, and the Saracens. Like the Jews they have maintained their manners, features, and religion; but the Coptic language has been replaced by the Arabic, and is retained only in a few religious ceremonies, just as Latin has been retained by the Roman Church. At the time of the Saracenic invasion of Egypt the Copts numbered perhaps two-thirds of a million people, but at the present time they do not exceed one-fourth of that number. Many have become Moslems. The Coptic church shows some signs of disintegration, in which case it is likely to be absorbed by the Roman Church. It has been suggested that the name Copt is derived from the last syllable of Egypt. The Copts of Egypt dress like Moslems, but wear a distinctive black turban. They are said to be gloomy, deceitful, and bigoted. They have black eyes and curly hair and are very expert in calculations. Like the Hebrews they take naturally to merchandising and to clerical work, rather than to agriculture. In the early days of the Coptic sect a considerable literature, consisting chiefly of the lives of saints and of religious homilies was produced.

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an author neglects to copyright his work he cannot recover damages.

International copyright arrangements have been entered into between a number of leading countries, whereby a citizen of one country may secure a copyright in all the others. Before the days of international copyright, American publishers were severely criticised, by English authors especially, for *pirating,* as it was called, American editions without making the European author compensation. Foreign governments issue long copyrights.

The persons entitled by act to copyright protection for their works are:

(1) The author of the work, if he is:

(a) A citizen of the United States, or

(b) A resident alien domiciled in the United States at the time of the first publication of his work, or

(c) A citizen or subject of any country which grants either by treaty, convention, agreement, or law, to citizens of the United States the benefit of copyright on substantially the same basis as to its own citizens. The existence of reciprocal copyright conditions is determined by presidential proclamation.

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b. Periodicals, including newspapers;

c. Lectures, sermons, addresses, prepared for oral delivery;

d. Dramatic or dramatico-musical compositions;

e. Musical compositions;

f. Maps;

g. Works of art; models or designs of works of art;

h. Reproductions of a work of art;

i. Drawings or plastic works of a scientific or technical character;

j. Photographs;

k. Prints and pictorial illustrations.

Coracle, an Irish or Welsh name applied to boats used by the native fishermen. A coracle consists of a wicker or basket-like frame, which in former times was covered by the skin of an animal. This was the kind of boat found in use by Caesar when he invaded Great Britain. It is usually oval in form, and has the advantage of being very light. Although it will carry but one person, it is transported easily from one body of water to another. It is, in this respect, at least, to be compared with the birch bark canoe of the Northwest. The Mandan Dakotas navigated the Missouri in coracles covered with green buffalo hides. See BOAT.

Common red coral.

Same, sectional view.

Sea-pen.

Sea-shrub.

Same, magnified highly.

Red coral, larvae escaping.

7. Vase coral. 8. Eye coral. 9. Creeping sea anemone. 10. Reef coral. 11. Sarcophytum. 12. Branching coral. 13. Sea anemone. 14. Ammothea.

CORALS.

Coral, a limy secretion of marine animals called polyps. These polyps are related to the sea anemone, the jelly fish, and to the fresh water hydra. There are numerous coral-producing species. Though called a skeleton, coral is produced on the outside of the animal for a shelter, or home in which to live. A piece of coral is usually the product of a large colony of polyps that bud or branch like trees. The coral of some species takes the form of a fan; of others that of a branching shrub or flower; or a mushroom; or a brain-like mass; or a bunch of moss. One might conclude readily that coral is a sort of limy moss or other vegetable growth; but in reality it is an animal production corresponding very closely to the shell of a snail. A coral mass consists of tubes in which the polyps find shelter. As the polyp extends, the tube in which it lives grows longer. The coral-producing polyps—they are not insects—appear to live on sea water. They require a temperature that never falls below 68°, a hard bottom to which to attach themselves, and sea water entirely free from mud or grit.

No coral is found on the western coast of the two Americas. On their eastern coast it is confined to tropical waters extending from Florida to Brazil. Red corals, much prized for necklaces and other articles of ornament, are found in the waters of the Mediterranean. Beautiful coral comes from Japan. Coral is found sometimes in masses of extraordinary size. In the southern Pacific and Indian oceans it not infrequently forms reefs from a few yards to many miles in length. The great Barrier Reef, thirty miles off the northeastern coast of Australia, is of coral formation. It extends 1,300 miles along the coast, with a total area of nearly 100,000 square miles. The water between the reef and mainland is seldom less than 36 feet deep. The outer wall of the reef is usually vertical. It has not been surveyed with accuracy, but in places it has been found to extend nearly perpendicularly 1,700 feet below the surface of the water.

The circular islands of the Pacific known as atolls are also of this nature; the reef taking the form of the circumference of a circle, inclosing a round lagoon within. It was supposed formerly that the lagoon marks the apex of an island which has gradually subsided, leaving a fringe of coral which the polyps have built up and up as the bottom sank, but this theory of subsidence is now in question. The reef corals are built on the plan of six or some multiple of six; that is to say, the tubes are six or twelve sided. The other group of fan corals is built on the plan of eight.

See NAPLES.

Corday, Charlotte (1768-1793), a French heroine. She was of noble birth and was educated in a convent in Caen. She read Voltaire and other progressive French writers, from whom she imbibed the principles of the French Revolution. The bloody scenes enacted by the Parisian leaders filled her with horror. She decided to sacrifice her life in an attempt to strike at the center of the band of men who directed the Reign of Terror. She repaired to Paris, and on July 13, 1793, she gained access to the apartments of Marat, and under pretense of presenting a petition for signature, stabbed that monster to death as he sat in a bath tub seeking relief from an affliction. Two days later she was tried by the tribunal, and was sent to the guillotine. Her act reminds the reader of similar self-sacrifices made by Russian women who have carried out the plans of Nihilist leaders. See MARAT.

Cordelia, the youngest daughter of King Lear in Shakespeare's tragedy of that name. Cordelia is introduced in the first scene. She does not appear again until the last part of Act IV. She speaks altogether but 115 lines. Nevertheless, throughout the entire play we are continually conscious of Cordelia. This is due, not alone to the fact that the entire action is a result of her conduct, but as well, to her character which Shakespeare's genius has "painted with few strokes yet vividly and perfectly."

The beautiful soul of Cordelia, that is little talked of by herself, and is but stingily set forth by circumstance, engrosses our feeling in scenes from whose threshold her filial piety is banished. We know what Lear is so pathetically remembering; the sisters tell us in their cruellest moments; it mingles with the midnight storm a sigh of the daughterhood that was repulsed. In the pining

of the Fool we detect it. Through every wail or gust of this awful symphony of madness, ingratitude, and irony, we feel a woman's breath.—Weiss.

Cordilleras, a range of mountains. The word is Spanish, meaning originally a cord or rope. It is a general word like plateau, and is used by the Spanish to designate a chain of mountains. As a proper name, the term was first applied by the Spaniards to the ranges of the Andes, and was extended to the ranges of Mexico and farther northward. American geographers are now pretty well agreed to confine the term to the vast mountain system embraced by the Rocky Mountains and the Sierra Nevada. The Cordilleras, taken in this sense, are a thousand miles in width in the latitude of Colorado, and extend from Central America to Alaska. The Coast Range and the Cascades are included.

Cordite, a form of smokeless powder used extensively by the military forces of Great Britain, and to a lesser extent by some other nations. Its name derives from its appearance, which is cord-like instead of granulated. Originally, cordite was composed of 58 parts of nitroglycerin, 37 parts of nitrocellulose and 5 parts of vaseline. Later formulae, however, call for less nitroglycerin and more cellulose. The powder burns very slowly, but explodes with great violence under pressure.

Cordova, the capital of the province of Cordova, Spain. It is situated on the Guadalquivir about fifty miles above Seville. It is noted for the manufacture of leather goods and silverware. The city has an interesting history. It is the old Colonia Patricia of the Romans, a place of wealth and luxury. The city is still surrounded by a mighty wall and massive towers. Part of the wall is Roman. In 572 Cordova was taken by the Goths. From 756 to 1051 it was the capital of Arabian Spain. Under the Moors the city walls were fifteen miles in extent, and the population is thought to have reached 1,000,000. The Moors erected their chief mosque here.

This structure is said to surpass the Alhambra in richness of decoration, mosaics and sculpture. The present population of Cordova is about 66,492.

Corduroy, a thick, corded, cotton fabric. It is used for the outer garments of laborers and those engaging in out-of-door sports. To a less extent, it is used for covering furniture and for fancy work. Corduroy is a pile fabric belonging to the same class as velveteen. The pile is produced by an extra system of weft threads, which "float" over the ground cloth. These wefts are firmly bound in at intervals. The loops are left on the surface in groups to form the cords. Between these groups, the pile weft disappears into the ground web of the fabric. The loops in the center of a group are longer than those on the sides. After weaving, these loops are slit by the cutter, brushed up and closely sheared. Corduroy was made first in France in the seventeenth century. It was designed for the wear of the king's huntsmen, the name, corduroy, meaning "king's cord." Corduroy has given its name to a kind of road constructed through swampy places by means of small logs laid close together crosswise, forming a solid but uneven roadbed.

Corea. See KOREA.

Corelli, kŏ-rĕl′lee, **Marie** (1864-), an English novelist. She was born in Italy and became the adopted daughter of Charles Mackay, the poet. The name Corelli was used in the first instance as a pen name, but has become her legal name. Her best known works are *A Romance of Two Worlds, Barabbas, The Sorrows of Satan, Thelma, Vendetta, The Mighty Atom.*

Coriander, a plant of the parsley family closely related to caraway, but growing taller. It is a native of the Mediterranean region. The seeds contain a strong oil of characteristic taste, and are used to flavor soups, cake, cookies, and confectionery. See CARAWAY.

Corinna, kō-rĭn′a, a Greek lyric poetess of the first half of the fifth century B. C. She was born at Tanagara, Boeotia, She is said to have instructed Pindar and to have won the victory over him five times in the public poetic contests. According to Pausanius, she was so beautiful that the judges may have been influenced in her favor. Only a few fragments of her poems are extant.

Corinth, a city of ancient Greece. It was situated on a narrow isthmus of the name—a portage where the wares of Italy and the West were exchanged for those of Greece, Asia Minor, and the East. The neck of land is four miles wide. A strongly fortified citadel added to the importance of the city. It was at one time at the head of the Achaean league. The Corinthian style of architecture was developed here. In its day the city was enormously wealthy, and was the most shamelessly profligate city in Greece. Paul's Epistles to the Corinthians were addressed to the Christian church here. A few pillars and ruins deeply buried in sand are all that remain of the celebrated city. The old marketplace has been excavated. It lies sixty feet below the present level. A neglected village of a few thousand inhabitants occupies a part of the former site. A sea level ship canal has been constructed across the isthmus on which Corinth formerly stood. This canal was completed in 1893, at a cost of $11,000,000. In one place the canal passes through solid rock. Massive walls rise on either side to a height of 260 feet. The passage is lighted at night by electricity. Iron rings are provided at intervals to which ships may tie for safety—against the winds that at times blow through the cut with the violence of a hurricane.

Coriolanus, Gaius Marcius, the hero of a legend of the early Roman republic. He became so unpopular when he proposed that no corn should be distributed to the plebeians during the famine in Rome in 491 B. C. unless they gave up their tribunes, that he was banished. Resolving to revenge himself upon his country, Coriolanus went to Rome's old enemies, the Volsci, and prevailed upon them to wage war on Rome. At the head of the Volscians, he won his way to the gates of Rome, refusing to make peace except on condition that Rome return the territory taken from the Volsci. But the tears of his mother, Veturia, softened the resolution of Coriolanus, and he withdrew his army. Numerous objections to this story, however, have been raised by the scientific modern historians of Rome.

Cork, the third city of Ireland. It is situated in the southern part of the island, about fifteen miles above the mouth of the river Lee. It is at the head of navigation and has extensive wharves, but Queenstown at the mouth of the harbor is the port of call for ocean-going steamers. The city exports butter, eggs, bacon, grain, and live stock. Irish friezes and whiskey are made here. The population of the city and suburbs in 1921 was 76,673. Dublin is largely English. Belfast is practically Scotch, but Cork, the seat of the County Cork, is considered a genuinely Irish city. See IRELAND.

Cork, the spongy outer bark of an evergreen oak. The cork oak grows along the coast of southern Europe and North Africa, but chiefly in Algeria, Spain, and Portugal, to which countries the cork industry is worth several million dollars a year. It is a low, spreading tree with chestnut-like acorns. When the trees are about ten or fifteen years old, the first stripping is made. It is coarse and uneven, and is used chiefly for fishing net floats and similar purposes. The second stripping is better. The quality improves with the age of the tree. Cork harvest comes in July and August. Only the outer bark is removed. Cuts are made around the tree and up and down, dividing the bark into suitable sections. The greatest care is taken not to injure the inner bark by cutting too deeply. The sections are then removed by inserting the flattened handle of the cutter's knife carefully. After scraping the outer surface the sheets are heated and slightly charred to close the pores. They are then flattened in a press and baled for market.

Owing to its toughness, lightness, and elasticity, and the fact that no liquid can pass through it, cork is in demand for bungs of casks, bottle stoppers, bicycle handles, shoe insoles, artificial legs, linings for insect cases, etc. Cork weighs a trifle less than a fourth as much as water. "As light as cork," is a proverbial expression. It is, therefore, an ideal substance for life preservers, buoys, and jackets. The inner bark of the cork tree, like all oak barks, is valuable for tanning. Cork has

a peculiar way of dulling a knife edge. Workmen who cut corks by hand whet for each cork. This difficulty is greatly in the way of contriving successful cork-cutting machines; yet but little of the work is now done by hand. Cork chippings and parings ground up with boiled linseed oil make a material which is applied to a coarse canvas in the manufacture of linoleum. Scrap cork is pressed also in damp-proof and insulating boards.

Cork is one of the oldest products known to history. Two thousand years ago it was used for several of the purposes that it fulfills today; namely, as stoppers for wine vessels, bungs of casks, life-preservers or cork jackets and buoys for fishing nets and the ropes of ship anchors. The introduction of glass bottles in the fifteenth century brought it into more general use as stoppers, and its manufacture then became an industry of importance. Seventy per cent of the world's supply is produced in Spain and Portugal, the finest grades being grown near Barcelona, while most of the low grade cork is produced in the Seville district. About 40,000 persons were employed in 892 cork factories in Spain in a recent year; and these produced for export 8,964 tons of shaped cork, 746 tons of small squares, 583 tons of other manufactured cork, and 50,198 tons of cork wood and cork waste. About 5,500 tons of cork sawdust are used in Spain every year for packing grapes and other fruit for shipment. The United States imported, in the year ending June 30, 1922, 151,425,654 pounds of manufactured cork, valued at $2,051,339, and 37,434,747 pounds unmanufactured, valued at $1,023,587.

When the sheets of cork, with the rough outer bark removed after stripping them from the tree, are received at the factory, they are first sorted as to grade and thickness. The economy of manufacture requires the most careful sorting, especially in making cork stoppers, for the maximum diameter of the cork depends on the thickness of the sheet, as the cutting is done across the grain. After sorting, a warm vapor bath follows, to soften the corkwood and prepare it for the various mechanical operations of cutting, tapering, etc. It is first sliced into strips by a sharp circular knife, revolving at high speed. The width of the strips is determined by the length of the cork desired. They are then passed through a blocking machine, which rapidly cuts out cylindrical pieces by means of a tubular punch, care being taken to cut out the corks from the strip as closely as possible, to avoid waste of material. For tapering corks, such as are commonly used by the druggist for medicine bottles, etc., the cylindrical pieces are passed through another machine, with a keen revolving blade that shaves the cork to the required shape, while the fine shavings are drawn away through air-suction pipes to be used in various ways as by-products of the factory. Both straight and tapered corks then are washed in large vats, dried in revolving cylinders of wire net in rooms kept at a high temperature, and again sorted and graded according to quality. There are about twenty regular grades recognized in the cork trade, besides many special grades. The output of a typical large factory being nearly five million corks a day, it will be seen that the work of the sorting room is very important, and expert testers are required to maintain the standards of grade and size.

Besides corks for "stopping" vessels ranging in size from large kegs and jars to the tiniest bottles on the druggist's shelves, and ranging in quality from the finest champagne corks to those used for soda-water bottles, many other useful articles are produced by the cork factory. Cork disks, washers, and gaskets by the million are punched out from the raw material; also hat linings, carburetor floats, penholders and tips, friction clutches for automobiles, nose strips for eyeglasses, etc. The finest grades of corkwood are also shaved into the cork paper used for cigarette tips, etc., and cork paper is made so thin that it takes several hundred sheets to make one inch in thickness.

In granulated form, cork is valuable as an insulator. It is prepared for this purpose by grinding up the factory waste or scrap, which often amounts to sixty-five per cent of the sheets or strips from which corks have been cut. Cork is a non-con-

ductor of heat and the granulated material is largely used for filling between the walls of cold storage rooms, iceboxes, and water coolers; also for insulating the pipes in mechanical refrigerating systems. Large quantities of scrap cork are also ground up and, with the addition of suitable binding material, made into a cork composition that finds many uses; for instance, with an asphaltic or other tough binder, it makes corkboard, which may be shaped into permanent form for insulating and other valuable purposes. Cork flour, another by-product of the factory, is made from cork scrap by a process of grinding something like that of the flour-mill; and this cork flour is utilized extensively in making linoleum and other floor coverings.

Corliss, George Henry (1817-88), an American civil engineer and inventor, was born at Easton, N. Y. He removed to Providence, R. I., in 1844, and in 1848 established the Corliss Steam Engine Company. He made many improvements and took out many patents on steam engines, and in 1876 furnished the Corliss engine of 1,400 horse power, which was installed in the Centennial Exposition, Philadelphia.

Cormorant, a family of fish-pursuing birds. Of thirty species ten are found in North America. They breed and fish in colonies, chiefly on the seacoast, but are found on large bodies of inland waters as well. They dive from the surface or from a low perch. The double crested cormorant, about thirty-three inches in length, chiefly black, nests in trees about the lakes of the upper Mississippi Valley. A colony nesting on an island in a lake, for instance, seems to map out the fishing waters. The females feed near the island; the males fly often several miles away each to his preserve. The cormorant pursues fish under water with inconceivable rapidity. The loon uses feet only, but the cormorant uses feet and wings. The feet fold when carried forward, and open during the stroke. The Chinese boat-dwellers train tame cormorants to catch fish. The cormorant sits on the side of the house-boat gravely watching for fish, which it is claimed he pursues to a depth of 100 feet, if necessary. A ring on the neck prevents the bird from swallowing the fish until fed by its master. The English nobility at an early date took fish in the same way. When at leisure a cormorant takes pleasure in playing with a live fish like a cat with a mouse. The fish is tossed into the air and caught again in the wide bill. See PELICAN; ANHINGA; ALBATROSS.

Corn, a term of varied application. Scriptural corn is barley or wheat. Wheat and other small grains are known as corn in England, and in Scotland it was at one time customary to apply the term to oats. American corn is Indian corn or maize—the Mondamin of *Hiawatha.* Quite recently a wild plant resembling maize has been discovered in the mountains of Mexico. The Indians call it coyote corn, because the coyotes feed greedily on the young ears. Botanists consider it the wild ancestor of our cultivated corn.

Botanically, corn is a grass, from three to sixteen feet in height. Corn has two kinds of flowers, the tassel which produces pollen, and the young ear, the long pistils of which are known as silk. Every grain of corn has its thread of silk. The common axis on which the grains grow is known as a cob. The cob surrounded by grains is known as an ear. The ear is inclosed by long strip-shaped leaves known collectively as husks. The number of rows of grain on the cob is always an even number.

Corn is native to Central America. Specimens were carried to Europe by Columbus. It was cultivated by the aborigines of Central and North America, chiefly, of course, by the labor of the squaws. It will be remembered that the Pilgrims and the early settlers of Virginia obtained supplies of corn from the natives. Its cultivation has extended wherever climatic conditions permit. Argentina and Uruguay in South America raise corn. Egypt, Italy, Southern Russia, Austria-Hungary, and the countries of the southern Danube, also produce considerable quantities. The flour merchants of Central Europe are supplied with cornmeal from the mills, chiefly, of Hungary. The great corn region of the world, however, lies in North

America, east of the one-hundredth meridian, and between the thirtieth and the forty-fifth degrees of latitude. The area of greatest production, the corn belt proper, is a strip of irregular width, passing from central Ohio westward between Chicago and St. Louis as far as the center of the boundary line which separates Kansas and Nebraska. Four-fifths of the world's corn crop is produced in the United States.

The range of corn is determined less by soil than by other conditions. Corn requires a warm summer, but cannot endure extreme heat or prolonged drouth. Its northern limit is determined by the length of the growing season, as corn is easily frosted. Efforts to produce varieties that mature early have been made, with encouraging results. The limit of profitable corn culture is 100 miles farther north than was deemed possible at the close of the Civil War. Other experiments carried on with intelligence through a number of years have resulted in improving the size of the kernel and general productiveness of corn. A good ear of corn may be described as tapering slowly, with a length of nine inches and a circumference of seven. It has long, wedge-shaped kernels, in from sixteen to twenty rows, with the tip well filled out, and a small cob easily broken out of the husk. One hundred pounds of such corn in the ear yield about ninety pounds of shelled corn. Successful farmers in the corn belt expect a yield of from 50 to 75 bushels of shelled corn to the acre, although the yield has been pushed considerably beyond the 100 bushel limit. The average yield in the corn belt, year in and year out, is 34 bushels. When planted 3 1-2 feet apart each way an acre contains 3,055 hills of corn.

The world's crop varies greatly from year to year according to rainfall, freedom from the attacks of insects, and lateness of the first autumnal frost. In 1899 the world produced 2,611,000,000 bushels; a year later, the combined yield of all corn-producing countries fell to a trifle over 2,000,000,000 bushels. In 1905 the United States alone produced 2,707,993,540 bushels. A recent writer has stated that if the corn crop of the United States were loaded on two-horse wagons, two tons to the load, and the wagons were to take the road, the nose of one team at the tail board of the wagon just ahead, the string of wagons would reach around the world six times.

Methods of cultivation vary greatly. The settler in a timbered country digs holes with a hoe among the stumps of his first clearing, and drops three or four kernels into each, thus raising a few bushels of corn of great service to himself and family. In the corn belt, where fields are broad, level, and free from obstructions, the work is done almost entirely by machinery. The land is turned over with gang plows, drawn by from three to five horses. The seed is dropped by a cornplanter which deposits a few kernels at regular intervals. The earth is stirred about the young plants and growing weeds are killed by the horse cultivator, or a series of small hoes swung from an axle and guided by the feet of the driver, who rides all day. The crop is cut with a corn harvester, that binds the stalks into sheaves and throws them off at one side. Husking by hand has been superseded in part by a cornshredder, a sort of threshing machine which shreds the stalks and shells and winnows the corn, delivering it into sacks at one side, like a threshing machine for small grain. The average amount of human labor required to produce a bushel of corn has been estimated at thirty-four minutes.

Considerable corn is consumed in the manufacture of cornmeal and cornstarch. As a food, corn ranks next to rice in the number of people it supports. Eleven million bushels of American corn are taken annually by the distilleries. Some corn is exported, but the bulk of it is used at home in feeding hogs, beef cattle, and work animals. In the absence of wild hay, many sections of the country depend almost entirely on corn fodder for rough feed. Intelligent feeders expect ten pounds of sound corn fed under proper conditions to thrifty animals, to produce one pound of beef, five pounds of mutton, or four and one-half pounds of pork. Corn is, therefore, very important to the farmer.

Much attention is paid to breeding corn. Raisers of seed are as eager for superior ears as dairymen are for a superior cow. At the Ames, Iowa, corn show of 1908 the champion ear sold for $28; the best ten ears brought $85; thirty ears sold for $65 and the prize bushel was bid in at $76. Secretary James Wilson, of the United States Department of Agriculture, writing of the corn crop of 1908, says:

Greatest of all crops is Indian corn, the priceless gift of the Indian, who freely gave to the white man information which led to the production of 2,643,000,000 bushels this year. The value of this crop almost surpasses belief. It is $1,615,000,000. This wealth that has grown out of the soil in four months of rain and sunshine, and some drouth, too, is enough to cancel the interest-bearing debt of the United States and to pay for the Panama Canal and fifty battleships.

The following statement shows the estimated corn crop of 1921 by states and territories which may be considered fairly representative:

State	Bushels
Maine	1,500,000
New Hampshire	1,325,000
Vermont	4,500,000
Massachusetts	3,120,000
Rhode Island	644,000
Connecticut	3,848,000
New York	36,708,000
New Jersey	11,327,000
Pennsylvania	76,272,000
Delaware	6,549,000
Maryland	25,155,000
Virginia	47,600,000
West Virginia	20,128,000
North Carolina	49,254,000
South Carolina	32,959,000
Georgia	69,975,000
Florida	11,032,000
Ohio	159,326,000
Indiana	169,848,000
Illinois	305,966,000
Michigan	66,417,000
Wisconsin	97,482,000
Minnesota	140,507,000
Iowa	444,190,000
Missouri	182,880,000
North Dakota	16,940,000
South Dakota	125,632,000
Nebraska	207,732,000
Kansas	102,142,000
Kentucky	82,150,000
Tennessee	90,713,000
Alabama	62,651,000
Mississippi	57,096,000
Louisiana	35,022,000
Texas	156,920,000
Oklahoma	76,925,000
Arkansas	60,148,000
Montana	2,560,000
Wyoming	1,232,000
Colorado	15,979,000
New Mexico	6,409,000
Arizona	1,115,000
Utah	517,000
Nevada	29,000
Idaho	1,598,000
Washington	2,400,000
Oregon	1,980,000
California	4,060,000

CORN CROP OF COUNTRIES NAMED

United States	3,080,372,000
Canada	14,904,000
Argentina	230,423,000
Chile	1,805,000
Austria	2,456,000
Bulgaria	34,385,000
Czecho-Slovakia	10,501,000
France	12,202,000
Greece	7,874,000
Hungary	27,141,000
Italy	91,484,000
Rumania	99,036,000
Spain	28,048,000
Switzerland	218,000
Algeria	358,000
Tunis	315,000
Morocco	3,726,000
Union of South Africa	43,320,000
New Zealand	439,000

During the war the corn crop in Europe was greately reduced, and the price of corn in the United States reached the highest point in its history.

During the year ending June 30, 1922, 124,591 bushels of corn were imported into the United States, valued at $137,029, and during the same period 176,409,614 bushels of corn, valued at $115,861,864, were exported to other countries. This shows a large increase in exports over the year 1921.

Corn Laws, statutes designed to promote or regulate the supply of breadstuffs. Corn is to be understood in the Old World sense of grain, chiefly wheat. That food might be plenty the Athenians forbade the outward shipment of corn (wheat), and required Athenian ships loaded abroad to carry wheat to the home country only. Rome enacted corn laws, even to the extent of giving grain to the needy.

Corn laws form an important chapter in the history of England. From the time of the Norman Conquest exportation of corn was forbidden strictly. In 1436 it was decided to permit the exportation, so long as corn, *i. e.,* wheat and barley, was

cheap at home. In 1571 the government decided to revise the laws again. By this time three contending interests were apparent—working people wanted a cheap loaf; landowners wanted a high rental for wheat fields; and Parliament, in which land owners, but not working people, were well represented, required a revenue for the government. It was decided to allow the exportation of corn so long as it was cheap, and on condition that the shipper pay a tax of so much per bushel into the government treasury. This was a victory for the government.

A hundred years later and after some tinkering, importation was prohibited, practically so, at least, by a high tariff, except as the price in England might rise above a certain high price. This was a victory for the land owner. In 1688, the year of the English Revolution, and subsequent years, land-owning interests again prevailed and the government undertook to pay a bounty on every pound of wheat, rye, oats, or barley shipped to foreign countries. After the Napoleonic wars, however, the land-owning class was affected by the fall of prices consequent upon the close of the war. Parliament in the interest of this class, passed the Corn-Laws forbidding the importation of foreign breadstuffs until the price of the domestic grain reached a certain price. A little later, because of the protests of the consumers, a sliding scale was introduced whereby it was provided that when the price of domestic grain rose above a certain point, foreign grain could be imported, but as soon as it fell below that price, importation must cease. These laws worked great hardship to the factory class, a vivid account of which may be found in Kingsley's *Alton Locke.* They continued in force, however, in spite of the opposition of Cobden and Bright until popular uprisings and the total failure of the potato crop in 1845 convinced Parliament that it would be wise to permit the buying and selling of foodstuffs without restriction. This new order went into effect in 1849; since which time the foodstuffs of America have been sold in Great Britain free from all but nominal taxation, and for many years the mere cost of inspection. It is interesting to note that there is talk of a revival of British import duties on breadstuffs.

See COBDEN; BRIGHT; IRISH FAMINE.

Corneille, kor-nē′yah, **Pierre** (1606-1684), a noted French dramatist and poet. He was a native of Rouen. He was educated at the Jesuit College in that city, and was admitted to the bar in 1624. He held the posts of advocate to the admiralty and to "waters and forests," for which he received, however, little remuneration. His profession seems to have brought him no other employment. His first dramatic production was *Mélite,* a comedy produced in 1629. *Mélite* was very different from the plays then in vogue, but it nevertheless scored a success and became popular. It was followed by others which, though now regarded unreadable, were at that time better than anything known. Richelieu appointed Corneille as one of his "five poets," which meant that it became his duty to write tragedies whose plots were furnished by Richelieu. Corneille was of too independent a character for this work and soon incurred displeasure by making changes in the plots assigned him.

In 1636 appeared *Le Cid,* a tragicomedy. This has been called the most "epoch-making" play in all literature. It was based on the old Spanish romances. Its immense success aroused the jealousy of Richelieu and the French Academy, and a famous controversy resulted. For years the history of the French stage was the history of Corneille's works. He is the father of French tragedy. *Les Horaces,* following *Le Cid* in 1639, shows greater power of invention than any other of Corneille's plays. *Cinna* was produced in the same year and was considered by Voltaire his masterpiece. Others regard *Polyeucte,* produced in 1640, not only as Corneille's best, but as the masterpiece "of Christian tragedy and the French theatre." Other works followed rapidly, *Le Menteur,* the greatest of Corneille's comedies, being especially worthy of note. And now began a decline as "rapid as his success had been brilliant." It is difficult to account for his loss of popularity. He doubtless feared criticism too much to allow himself

to be guided by his own genius. He had aroused envy and jealousy, and seems to have been angered at having to fight his way. From 1653 to 1659 Corneille devoted himself to poetry and produced no dramatic work. Persuaded to change his resolve, he began dramatic work again in 1659; but, although he produced several plays, they did not attain the celebrity of his earlier dramas. During the last ten years of his life Corneille wrote little. He suffered nearly all his life from poverty—at that time a playwright was but poorly paid—and toward the last he was well nigh destitute. Boileau, who had ever befriended Corneille, persuaded the king to send him assistance, but he died two days afterward.

There is a striking inequality in Corneille's writings. While he has produced work that places him in the front rank of French dramatists, he has written much which is dull and tedious, showing no sign of genius. Molière said, "My friend Corneille has a familiar who inspires him with the finest verses in the world. But sometimes the familiar leaves him to shift for himself, and then he fares badly. Corneille enjoyed, however, immense popularity for a time, and always large appreciation. Boileau, when asked concerning the great men of Louis XIV's reign, replied, "I only know three, Corneille, Molière, and myself." "And how about Racine?" he was asked. "Racine was an extremely clever fellow," he replied, "whom I taught with great difficulty to write verse."

Corneille was not personally prepossessing. Either from shyness, or pride, or both, he preserved a certain rusticity of manners and speech which tended to repel strangers. Racine is said to have remarked to his son that Corneille wrote verses a hundred times more beautiful than his own, but that he was the more popular of the two because he took some trouble to make himself personally agreeable. Sometimes Corneille's friends would take him to task for not cultivating the graces of society, when he would reply, "Je suis toujours, Pierre Corneille,"—I am always Pierre Corneille.

Following are quotations and criticisms:

QUOTATIONS.

A liar is always lavish of oaths.

He who talks much says many foolish things.

He who does not fear death cares naught for threats.

He who is hated by all cannot expect to live long.

He who allows himself to be insulted deserves to be so.

Clemency is the surest proof of a true monarch.

Corneille was the first dramatist who made the sentiment of admiration the basis of tragedy instead of terror or pity.

His rank among the great dramatic poets is not a matter of question. A poet is to be judged by his best things, and in these Corneille is second to none.—*Britannica.*

Corneille's chief merit lies in his dignity of style, and in a certain declamatory grandeur of sentiment, which his countrymen have been accustomed to consider truly epical, and which it is now impossible to convince them as nearly resembles rant as it does sublimity.—*Chambers.*

Cornel. See Dogwood.

Cornelia. See GRACCHI.

Cornell, Ezra (1807-1874), the founder of Cornell University. He was a mechanic of Ithaca, New York. In the early days of the telegraph, they laid the wires in a plow furrow. Cornell was the first to suggest stringing them on telegraph poles. He made a fortune by constructing and operating telegraph lines. He gave half a million dollars to erect the first buildings of the institution which bears his name, and enriched it with subsequent gifts and services. The autobiography of Andrew D. White, the first president of Cornell, gives an excellent account of the philanthropist's methods and motives.

Cornell University, an institution of higher education at Ithaca, New York, was founded in 1865. For its endowment it received from the State of New York that state's share of the federal land grant of 1862, in the form of scrip representing about 990,000 acres. Ezra Cornell gave the university $500,000 and 200 acres of land at Ithaca, and he multiplied the value of the federal endowment by his wise management of the property. Hiram Sibley, Henry W. Sage and John McGraw gave large sums for buildings and endowment.

On its general foundation the university maintains a graduate school and colleges of arts and sciences, law, engineering and architecture. Its medical college, situated in New York City, was founded and endowed by Colonel Oliver H. Payne. The state supports the verterinary college and the college of agriculture.

The university's productive funds in 1922 were $19,565,600 and the value of its real estate and equipment was $9,890,000. Its income applicable to current expenses for the fiscal year ended June 30, 1922, was $5,543,270, of which $1,437,940 was received from the state and $320,300 was received from the United States. The number of regular students in 1922 was 5,188, and 2,146 other students attended the summer session. The faculty numbers 788. The library contains 670,000 volumes.

The governor and several other state officers are *ex officio* members of the board of trustees. The board itself elects fifteen members, the alumni elect ten, and the Governor appoints five. The faculty elects three representatives who sit with the board but do not vote.

Cornet, a wind instrument of brass or silver, somewhat resembling the bugle. The word cornet is French, a diminutive of the Latin word *cornu,* meaning a horn. The instrument consists of a curved tube, fitted with a bell-shaped mouth-piece, and provided with valves or pistons by which the pitch of the tone may be varied. It is used in brass bands to furnish soprano and contralto parts, and is a special favorite as a solo instrument in open air concerts, but its music is considered too harsh and penetrating for regular orchestras.

Cornwall, the most southwesterly district of England. The county is a narrow point of land with a total area of 1,357 miles. The southwest extremity is known as "Land's End." Cornwall shares with other parts of England a reputation for cattle and sheep raising, and for market gardening. It is noted for ancient mines of copper and tin, some of which have been worked to a depth of 2,000 feet, extending far out beneath the sea. The miners at work in their galleries can hear the surf beating above their heads. Pumps are required to keep the mines from becoming flooded. These mines have been worked from time immemorial. They are diminishing in importance. The inhabitants, called Cornishmen, are descendants of the ancient Celts. They are akin to the Welsh, and to the inhabitants of Brittany. Until of late the Cornish dialect was the language of the people; but, through the influence of public schools, it has been replaced by English. Many have migrated to the mining districts of the United States. See CELT.

Cornwallis, Charles (1738-1805), a British general. His father was an English nobleman, to whose estates he succeeded in 1762, with the title of earl. Cornwallis deserves to be held in greater respect than is accorded him by the average American. He was well educated, and served his country honorably. In Parliament he was a friend of America, and opposed the policy that led to war. So outspoken was he that when it became necessary to send his regiment to America, the king offered to give him leave of absence; that is, to excuse him from service; but Cornwallis preferred to lead his own soldiers. He served under Howe and Clinton in the vicinity of New York. All must admit that his campaigns in the Carolinas against Gates and Green were vigorous. His taking a position at Yorktown, and subsequent surrender, were due far more to conflicting orders from Clinton and lack of support than to any want of vigor or skill on his own part. After the close of the American war, Cornwallis served his king in India and sat in the privy council. He was buried in St. Paul's Cathedral, where his memorial tablet may be seen in company with those of Admirals Rodney, Howe, and Nelson, and Generals Abercrombie, Sir John Moore, and others who are deemed to have served their country well. See YORKTOWN.

Coronach, kŏr′ō-năk, a dirge, a lamentation, customary among the ancient Scotch and the Irish. It was sung usually by professionals, who recited the virtues and exploits of the dead. Scott's *Lady of the Lake* gives a fine specimen of the coronach

chanted to the sad music of the bagpipe over the remains of Duncan.

Coronado, kō-rō-näh′dō, **Francisco Vasquez de** (1510?-1542?), a Spanish explorer of New Mexico and provincial governor of Mexico. Great stories were afloat in his time of the "Seven Cities of Cibola" and their fabulous wealth, and in 1540 Coronado set out from Culiacan to search for them with a company of 1,100 soldiers and Indians. He found the seven pueblos of Cibola, but only as poor Indian villages; so he started eastward and explored what is now New Mexico, probably traversed parts of Texas, Colorado, Oklahoma, and on as far as northeastern Kansas, when he gave up his vain hunt for gold and returned to Mexico, many of his followers having perished in the desert. His papers mention the agricultural possibilities of that country, and tell of herds of "humped cattle," the first accurate description of the American buffalo or bison.

Coroner, a county officer whose business it is to inquire into the cause of a sudden or suspicious or accidental death. He has power to empanel a jury and examine witnesses. A coroner's verdict to the effect that the deceased came to an end by foul play, or through the carelessness of another, lays the basis for criminal action by indictment, or for a damage suit to be brought by the relatives. The coroner is usually elected by ballot, the same as other county officials.

Corot, ko-rō′, **Jean Baptiste Camille,** (Paris 1796-1875), a French landscape painter. He has high rank as a painter of landscapes, for which he made extraordinary preparation by a diligent study of nature. His paintings are marked for their sobriety of coloring. It is said that he was the first artist to reveal the possibility of brown and gray. With these colors, aided by pale green, he painted a large number of scenes with exquisite dawn and twilight effects, including, *Morning, Evening, Sunset, Rest, Solitude, Landscape with Figures, Pleasures of Evening,* etc. The Boston Art Museum, the New York Metropolitan Museum, and other American galleries possess specimens of Corot's work.

Corporation, an association or company authorized by law to act as though it were one person. A corporation possesses several advantages over a partnership, and is now the usual arrangement by which banks, railroads, manufactures, and commercial enterprises are managed. A corporation must have a name and must operate under so-called articles, setting forth the kind of business proposed, the manner in which it is to be conducted, and the amount of money, that is to say, capital stock, to be invested. The capital stock is sold to members who thus become shareholders. The management of a corporation is intrusted usually to a board of directors elected annually by ballot, each shareholder being entitled to as many votes as he holds shares of stock. The directors are empowered usually to appoint a president, vice-president, a secretary, and a treasurer from their own number; to fix salaries; and to employ, if necessary, a manager for the business.

Beyond taking part in the annual election of directors the stockholders cannot control the management of the business. This is one of the great advantages of a corporation. In a partnership, a partner who becomes dissatisfied can call for a division and interrupt seriously an enterprise in hand; but a dissatisfied shareholder cannot interfere with the management of a corporation. He may sell his stock, or labor for a change of management; but cannot step in and interfere with what the manager is doing. It would be very awkward, for instance, if seventy-five people owning a railroad in partnership were to become dissatisfied and demand a division of the property, one taking a locomotive, another half a dozen freight cars, a third, two passenger coaches, and others again different sections of the railway, depots, stations, etc.

Another advantage of the corporation is that it permits many people to invest their money in the same business, and yet keeps the management in the hands of a few. It is pretty difficult for half a dozen partners to agree as to the details of a business; yet several thousand shareholders in a corporation find no difficulty in managing a busi-

ness efficiently through a simple method of electing officials from whose decision there is no appeal. The large amount of capital required to carry on such an enterprise as a transcontinental railway, for instance, is beyond the means of a single individual; and even if brought together it could not be held together by any form of partnership. Incorporation seems to be the only practical method of carrying out a large enterprise.

In the eye of the law a corporation is a single individual. It can sue and be sued. It can sell, buy, and hold property. Stockholders may die, but the corporation lives. Stockholders may change, but the corporation is the same. It possesses a certain individuality or personality of its own, independent of its shareholders. A shareholder cannot be sued for the debts of the corporation, nor be held liable for its acts. A corporation may steal timber; its officials may, indeed, be punished, as officials; but the shareholders are not personally answerable to the law. The property of the corporation may be taken to pay for trespass or other damage, but the shareholder's private property may not. One's share in a corporation may be seized and sold for debt, just as his horse or farm may be taken; but a corporation cannot be made to pay the debts of a shareholder. The shareholder and the corporation are two entirely distinct individuals. Profits may be divided among shareholders according to the number of shares held by each. Such payments are called dividends. By general agreement a loss may be made up by an assessment; but ordinarily a corporation has no authority to call upon stockholders to make losses good, any more than a man has a right to call on his neighbors to make up his losses.

The exemption of stockholders from responsibility for corporation debts is subject to two exceptions. In case the original stockholder has purchased his stock for less than par value, he may be required, in case of need, to pay into the treasury the rest of the sum represented by his stock. This is a principle of common law designed to protect creditors who had reason to suppose the corporation had received the face value for stock sold. Some states make stockholders liable for debts twice or three times the amount of stock held.

There are disadvantages connected with corporations. It is hard to right a wrong done by a company of this sort. The stockholders, who may have instigated unlawful acts, hide behind a board of directors, and it is difficult to hold them responsible. Large shareholders not infrequently elect themselves to official positions in which they draw large salaries or otherwise manipulate the business in such a way that the interests of the smaller shareholders are neglected. Dividends may be deferred until the small holders are forced to sell their shares at a ruinous price.

The laws of New Jersey are particularly favorable to the incorporation of the large companies known as trusts. The fees of the state from that source are very large, amounting to $3,500,000 for the year 1904. In 1909 Congress imposed an income tax on corporations designed to produce a revenue and to give the general government an opportunity to know more of the business done by corporations. See TRUST.

Corpulence, portliness, bulkiness of body. Stoutness may be regarded either as a disease or as excessively good health. It is usually accompanied, if not caused, by a good appetite, an excellent digestion, tranquillity of mind, and indisposition to physical exertion. It is not, however, indicative of a sluggish mind. Dr. Samuel Johnson may be mentioned as a corpulent man with a vigorous mind. Stoutness is an enlargement of the soft organs of the body, and an overloading with fat. The muscles and bones do not increase in weight. The cure for ordinary corpulence is exercise, or labor to the point of perspiration, and the avoidance of fat-building foods, such as sweets, fats, wines, potatoes, and rice. Lean meat, game, eggs, fish, green vegetables, especially cabbage and asparagus, and brown bread are recommended. Vinegar is an antifat food article. Many mineral waters have the effect of reducing weight. Bismarck was helped greatly by the use of Kissingen spring water.

Corpulence is due frequently to inherited tendencies in which case a fleshy person may be, and often is, a light eater. Not infrequently corpulence comes on a strong, healthy person as the result of high living and inactivity. Excessive corpulence is due sometimes to a diseased condition of the body which may or may not yield to medical treatment. An instance of the latter case is that of Daniel Lambert of Leicester, England, who died in 1809 in his fortieth year. Lambert ate moderately, drank water only, and slept less than an ordinary person; yet weighed 739 pounds. His waistcoat, still preserved, is so large that it may be buttoned around seven ordinary men. Lambert is supposed to have been the heaviest man that ever lived. He was only five feet eleven inches in height. Other cases are recorded in English journals. A grocer died in 1750, at the age of 29, whose weight was 616 pounds. Another young man, dying at 22, weighed 643 pounds. A girl of 4 is mentioned in scientific papers in 1813 as weighing 256 pounds.

It is stated on good authority that well proportioned men of middle age whose height is 5 feet 6 inches; 5 feet 9 inches; and 6 feet; should weigh about 150, 165, and 180 pounds, respectively. A woman 5 feet 2 inches in height should weigh about 125 pounds.

Corpuscle. See BLOOD.

Corregio, kōr-rĕd′jō (1494-1534), an Italian painter. He is noted for graceful figures and his handling of perspective. His pictures are highly prized in the galleries of Europe. His subjects are similar to those of Michelangelo and Raphael, with whom he is, in a way, associated and ranked; but he could be spared with far less disaster to art. *Holy Night,* his most celebrated painting, hangs in the Dresden Gallery. Artists consider it a masterpiece of light and shade. There are six of Corregio's paintings in this gallery. They cost Augustus $90,000. Others are to be found at London, Paris, Naples, Florence, and Rome; but most of Corregio's work was done by way of interior decoration for the churches of Parma. In the main dome of the Parma Cathedral, he painted the Assumption of the Virgin. Mary, the mother, is borne aloft by a host of rejoicing angels, while Christ, the Son, hastens to meet her. Corregio was the son of a Modena merchant. He lived chiefly in Mantua and Parma. He died without having visited Rome, Florence, or any of the renowned art centers.

Correlation. See MEMORY.

Correspondence Schools. See SCHOOLS.

Corrosive Sublimate, the bichloride of mercury, called "corrosive" because of its vigorous action on the body tissues, and "sublimate" because produced by sublimation. It is a heavy, white, crystalline substance, moderately soluble, and with an acrid taste. It is a virulent poison. The white of eggs is useful in counteracting its effects when taken into the stomach, but an emetic or the stomach-pump had better be used. It is a powerful antiseptic, and under the name "bichloride" is used in the bath after a contagious disease. It is to be carefully distinguished from the other chloride of mercury known as calomel. See MERCURY; CALOMEL; POISON.

Corsairs, pirates of the Barbary coast.

From the days when Barbarossa defied the whole strength of the Emperor Charles V, to the early part of the present century, when prizes were taken by Algerine rovers under the guns, so to say, of all the fleets of Europe, the Corsairs were masters of the narrow seas, and dictated their own terms to all comers. Nothing but the creation of the large standing navies of the present age crippled them; nothing less than the conquest of their too convenient coasts could have thoroughly suppressed them. During these three centuries they levied blackmail upon all who had any trading interests in the Mediterranean. The Venetians, Genoese, Pisans in older days, the English, French, Dutch, Danish, Swedish, and American Governments in modern times, purchased security by the payment of a regular tribute, or by the periodical presentation of costly gifts. The penalty of resistance was too well known to need exemplification. Thousands of Christian slaves in the bagnios at Algiers bore witness to the consequences of an independent policy. So long as the nations of Europe continued to quarrel among themselves, instead of presenting a united line of battle to the enemy, such humiliations had to be endured; so long as a Corsair raid upon Spain suited the policy of France; so long as the Dutch, in their jealousy of other states, could declare that Algiers was necessary to them, there was no chance of the plague subsiding; and it was not till the close of the great Napoleonic wars that the Powers

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